WONDERS OF THE VEGETABLE WORLD

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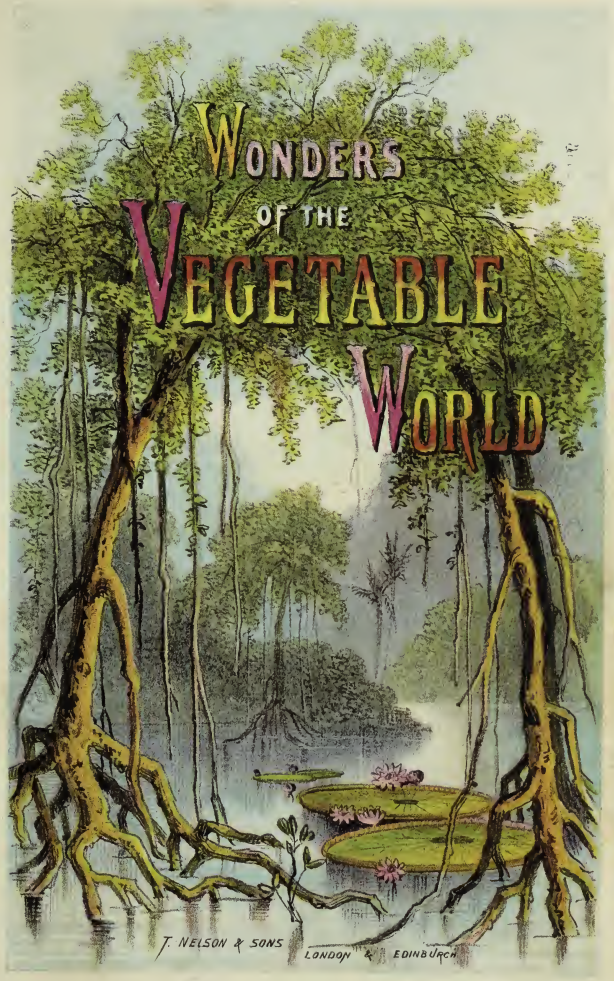
THE TRAVELLER'S TREE


WONDERS
OF THE
VEGETABLE
WORLD
T. NELSON & SONS
LONDON & EDINBURGH

WONDERS OF

THE VEGETABLE WORLD.

" Here on earth
God hath dispensed his bounties as in heaven "
MILTON.

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Preface.

THE study of Botany is full of interest to every well-regulated mind, and its attractions may fairly be described as inexhaustible. It has, moreover, the advantage of being, at all times and in all places, available; of requiring no ponderous library of reference; of needing no professors to be continually explaining its arcana. The books of the botanist are everywhere,—in the meadow, and the wood, and the valley; by the marge of the running stream, in the silent pool, on the weedy shores of estuaries and seas. They are always open—at sunrise as at sunset, in the glow of summer as in the cold airs of winter; and on all their pages you may find written abundant testimony to the wisdom, goodness, and power of the Creator.

This little volume is intended as an introduction to a study at once agreeable, useful, and humanizing.

It does not deal, however, with the scientific elements or technicalities of Botany. It is an introduction in this sense only: that, by describing the remarkable characteristics of some famous trees and singular plants, it shows how genuine is its interest, how delightful its variety, how manifold are its uses; and thus—the writer hopes—will induce the youthful reader to cultivate a further knowledge of the science. Like other volumes in the same series, it is intended to illustrate and enforce the truth of the poet's assertion,—

> "To know
> That which about us lies in daily life
> Is the prime wisdom;"

and to engage the mind of youth in meditation upon the wonders and beauties of the Divine handiwork as "a revelation from the Most High."

W. H. D. A.

WONDERS

OF

THE VEGETABLE WORLD.

I.

A Brazilian Forest.

"One vast mass
Of mingling shade."—SHELLEY.

THERE are few of us insensible to the beauty and the joy of woods, the charms of leafy groves, and the mysteries of venerable forests. There are few whose ears are deaf to the music of the whispering leaves, when the breeze is wandering from glade to glade, and avenue to avenue, like a spirit in search of some sister loved and lost. There are few whose eyes cannot perceive all the glory of colour which steeps the woodland in lustre;—the bright emerald green of the spring-time; the riper hues of summer; and the purple and gold and crimson in which autumn rejoices, like a king in his regal pomp. There are few who love

not the forest gloom, and the long arcades of ancestral trees, and the sense of awe and loneliness which seems to belong to their silent depths, recalling the old myths of the poets, the legends of fabulous Arcady, and the days of oreads and hamadryads, or gnomes, elves, and fays. Minstrel and painter have found an inspiration in woodland scenery from all time; from the days of Theocritus to those of Tennyson,—from the days of Poussin and Salvator Rosa to those of Turner and Creswick. The forest has ever been the region of charm and spell. It figures in the fairy song of Ariosto, in the fantastic poem of Spenser; it is rich with the legendary superstitions of Germany, and the folk-lore of our English land. All that is sublime and inspiring in our thoughts or dreams is naturally associated with the forest; and into its dim recesses the philosopher retires to meditate, the savage to worship his self-conceived gods—youth to indulge in its vagrant fancies, and love to repose in radiant visions. "Mark the sable woods," exclaims the poet,—

> "Mark the sable woods
> That shade sublime yon mountain's nodding brow,
> With what religious awe the solemn scene
> Commands your steps! as if the reverend form
> Of Minos or of Numa should forsake
> The Elysian seats, and down the embowering glade
> Move to your pausing eye."

The interest and wonder of the forest, moreover, are inexhaustible. Nature scatters abroad her wealth with a hand that is never weary. No two trees are alike, no two leaves exactly resemble one another. There is no need for copying, for servile

imitation; the Mind that conceived this mighty whole can no more stint its glorious ideas than the clouds cease to drop moisture. Look at the leaf of the ash, so brightly green and regular in shape; contrast it with the narrow spiky leaf of the willow or the dark crumpled follicle of the birch; each how different, yet each how exquisitely made! A similar diversity is observable in branch, and bough, and stem, and root; the oak is as unlike the beech as the alder is unlike the chestnut. Nor are they less various in their uses and properties. The ship-builder claims the oak and the "Pontic pine;" the builder lays his hand on the cedar and sycamore; the chemist draws a valuable extract from the yew; and for the last covering of our mortal dust we appropriate the elm. They change, too, in their individual aspects with every month, nay with every hour of the day; from the fresh dawn of morning to the gray shadows of evening twilight, undergoing a change of outward seeming, but ever crowned with an air of majesty, like a hero who towers superior to the conditions that surround him. One might spend one's life in the forest, and daily find some fresh theme for pleasant meditation, some new food for a graceful curiosity. The fir woods that hang upon the slopes of the Scottish mountains; the rich deep masses of beech that clothe the round outlines of the Chiltern Hills; the patches of venerable trees that still linger within the circuit of the New Forest—trees which flourished in stalwart vigour when far below

"The Roundhead rode,
And hummed a surly hymn,"—

all these have a charm, a value, and an interest, which would occupy one for years before one could fully recognize all their various and ever-varying relations.

But it is not of English trees,—neither of the famous oak, inseparably associated as it is with our national glories; nor of the stately elm, where the rook loves to build his substantial nest; nor of the graceful ash, the last to wave its banners of bright green, and the first to fold them before the coming winter; nor of the yew,

> "Beneath whose sable roof
> Of boughs, as if for festal purpose, decked
> With unrejoicing berries, ghostly shapes
> May meet at noontide;"

it is not of the chestnut, which welcomes May with so radiant a burst of blossoms; nor of the willow, drooping low over the silent grave; nor of the quivering aspen, nor the far-spreading sycamore, that I am about to speak. With these dear old glories of our native land—these familiar friends of our boyhood, in whose embracing arms we have often taken rest—we need not now concern ourselves; but going "further afield," and venturing into strange tropic regions, where Nature riots in a luxuriance all unknown to our temperate climes, I shall surely light upon more curious trees and plants—more wonderful though not more beautiful—than those which make up our native woods, and find somewhat to say about their properties and uses which will amuse, and yet instruct, my "gentle readers."

Have they ever, I wonder, attempted to form any

idea of what a tropical forest *is?* An English grove or a Highland wood is, as I have said, full of attractiveness and interest; very impressive in its grave and tranquil beauty; but to the artist's eye it can never compare with a tropical forest, all aglow with intense colour, and full of exuberant life! The depths of Borneo or Ceylon; the primeval masses which for hundreds of miles clothe the hot reeking lowlands of the Amazons; or those Brazilian wildernesses, the "virgin forests" whose unfathomable depths have never been disturbed by the foot of man since the earth first rose out of chaos,—no tongue can tell, no pen can describe, their marvellous and all-abounding splendours! Huge trees, soaring to the height of one hundred and one hundred and fifty feet; trees whose giant stems shine like the columns of some mystic natural temple; trees whose branches are thickly embowered in softest mosses and the most dazzling foliage, whose closest shades are haunted by myriads of rare birds and insects, and whose far-reaching arms are interlaced by bands of glittering climbers, while scores of parasites—

> "Like restless serpents, clothed
> In rainbow and in fire"—

twine around their gray trunks in strict embrace, and adorn their colossal majesty with blooms, "minute yet beautiful." Trees, and climbers, and parasites; grasses, rich mosses, and ferns almost as tall as trees; these spread over many a league of unknown and unexplored ground, along the banks of mysterious streams, into the heart of inaccessible valleys! Trees

everywhere: weaving their branches together so closely, that even at noon the forest-depth is obscure as twilight; and so intertwining their parasitical overgrowth, that the traveller finds himself at all points confronted by an insuperable barrier! Trees everywhere: some with long, narrow, pendulous leaves—others with fan-shaped leaves; these with leaves drooping like a warrior's plume—those with leaves sharp and erect like a soldier's spear! Trees everywhere: some tall and stately as a Grecian pillar; others bent and gnarled, as if Time had treated them sorely. Trees, and thorny shrubs, and flowering shrubs, and creepers, and immense ferns, both climbing and epiphytous,—trees around you and above you, until, to the confused eye, all nature seems transformed into one vast and inextricable wilderness of leaf and blossom;—such is a tropical forest.

Mr. Bates, in his South American travels, visited the "forest-country" around Pará—that is, an unbroken forest extending three hundred miles southward and eastward of that city. He never succeeded in penetrating into its interior, but frequently explored the outskirts, and this is the scene he was wont to wonder at:—

The ground was thickly carpeted with Lycopodiums,* but it was also encumbered with masses of vegetable *débris* and a thick coating of dead leaves. Fruits of many kinds were scattered about, amongst which were numerous species of beans, some of the pods a foot long, flat and leathery in texture, others hard as stone. In one place might be seen a quantity

* Order Lycopodiaceæ; club-mosses.

of large empty wooden vessels; such they appeared to be, but in reality they had fallen from the Sapucaya tree. They are called *Monkey's Drinking-cups* (Cuyas de Macaco), and are the capsules of the nuts sold under this appellation in Covent Garden Market. The top of the vessel is pierced with a circular hole, in which a natural lid fits easily. When the nuts ripen this lid becomes loosened, and down falls the heavy shell with a crash, scattering the nuts over the ground. The tree * which bears this extraordinary burthen is of immense height. It is closely allied to the Brazil-nut tree, † whose seeds are likewise enclosed in large wooden vessels, but these are without lids, and fall entire to the ground. It is at least 120 feet high, and rises to the noble stature of 100 feet before it throws off any branches. From twelve to twenty of these sweet edible nuts lie in a pod. The monkeys are very partial to them, and will patiently sit for hours hammering at a capsule with a stone, in order to open it; and as soon as they have succeeded, the on-lookers rush to the spot, to purloin as many as they can. The natives assail the quarrelling party with stones, a proceeding which incites the monkeys to revenge themselves by a discharge of nuts. By this means the Indians load their boats without trouble, and the monkeys are left to make a fresh foray.

In his forest wanderings, Mr. Bates was especially attracted by the colossal trees. He says that, on the whole, they had not remarkably thick stems;

* Lecythis Ollaria (order Lecythidaceæ).
† Bertholletia Excelsa (same order).

the great and uniform height to which they grow without throwing off a branch is a much more noticeable feature than their thickness; but at intervals he paused before a veritable giant. Only one of these huge patriarchs of the woods can flourish within a given space; it monopolizes the domain, and none but humble individuals can nestle within its shadow. The cylindrical trunks of these larger trees were generally about twenty to twenty-five feet in circumference. Von Martius, another Brazilian traveller, mentions having measured trees in the Pará district, belonging to various species (Symphonia coccinea, Lecythis spirula, and Cratæva Tapia), which were fifty to sixty feet in girth at the point where they become cylindrical! The height of the vast column-like stems could not be less than 100 feet from the ground to their lowest branch. The total height of the Pao d'Ano * and the Massaranduba, stem and crown together, may be computed at from 180 to 200 feet. Where one of them stands, the vast canopy of leafiness rises above the other forest trees, like a domed cathedral above the minor buildings of a city.

A very curious feature in these trees is the growth of buttress-shaped projections around the lower part of their stems. The spaces between these buttresses, which may be compared to thin walls of wood, form spacious chambers, like stalls in a stable; some of them large enough to hold half-a-dozen persons. "The purpose of these structures," says Mr. Bates "is as obvious, at the first glance, as that of the

* Order Bignoniaceæ.

similar props of brickwork which support a high wall. They are not peculiar to one species, but are common to most of the larger forest trees. Their nature and manner of growth are explained when a series of young trees of different ages is examined. It is then seen that they are the roots, which have raised themselves ridge-like out of the earth; growing gradually upwards as the increasing height of the tree required augmented support. Thus they are plainly intended to sustain the massive crown and trunk in these crowded forests, where lateral growth of the roots in the earth is rendered difficult by the number of competitors."

Among other remarkable inhabitants of the Brazilian wilderness, we may name the lofty Moira-tingu,* the Samaüma,† and the Massaranduba or cow tree.‡ The Eriodendron Samaüma, or silk-cotton tree, holds in the New World the same position as the Bombax in the Old. It rises to an enormous stature without branches, and then spreads out a glorious mass of foliage. The bark is light in colour; and the capsule-pod contains a large quantity of down, of a brown tint, and exquisite silky softness. The Massaranduba is also called the Palo de Vacca, the Arbor de Lacte, the Galactodendron utile, or the Cow tree. Its bark furnishes an abundant supply of milk as pleasant to drink as that of the cow. If exposed to the air it thickens into a glue, which is excessively tenacious, and often employed to cement broken crockery. The tree has a wild strange ap-

* Order Leguminosæ, tribe Mimosæ.
† Order Sterculiaceæ. ‡ Order Urticaceæ.

pearance, owing to its deeply-scored, reddish, and rugged bark, a decoction of which is used as a red dye for cloth.

Did our readers ever hear of the Pashiúba, or bulging-stemmed palm?* It is not one of the tallest kinds, for its height, when full grown, seldom exceeds forty feet; the leaves are somewhat less drooping, and the leaflets broader, than in other species; but if less beautiful, it is, perhaps, far more remarkable. Its roots grow above ground, radiating from the trunk at an elevation of ten or twelve feet, so that the tree seems to be supported on stilts; and when it is old, a person can stand upright amongst the roots with the perpendicular stem wholly above his head! About midway, this stem bulges out in a circular swelling, which gives it its distinctive name. The roots closely resemble straight rods, but they are studded with stout thorns, whilst the trunk of the Pashiúba is perfectly smooth.

Such are some of the marvels of a Brazilian forest — perceptible to the traveller even at a cursory glance. There are others, however, which must be noticed more in detail, and the entire vegetable world is full of "curious things," that command our admiration and excite our wonder. To these will the succeeding pages be devoted.

* Iriartea Ventricosa.

II.

The Palm Tribe.*

"Those groups of lovely date trees bending
Languidly their leaf-crowned heads,
Like youthful maids, when sleep descending
Warns them to their silken beds."

MOORE.

LINNÉ, the great botanist, has not inaptly called the tall and crested Palm trees "the princes of the vegetable world," and wherever they bloom they enrich the landscape by their grace and majesty. The most perfect of the tribe have a tall cylindrical stem, which shoots upward from the earth, without knot or blemish, like an Ionic column; springing to an immense height, and yet so symmetrical that its slenderness conveys no idea of feebleness. The summit bears a crown of emerald green plumes, like a diadem of gigantic ostrich-feathers; these are frequently twenty feet long, droop slightly at the ends, and rustle musically in the breeze. In the arid desert it forms an object of peculiar beauty, as it soars, erect and graceful, near some welcome spring of living waters, a landmark to the wayworn traveller; but to see it in all its glory you must visit the palm-groves of Tropical America, or Polynesia, and wander enchanted in

* Order Palmaceæ.

their grateful shades. Under the natural screen which the thick green feathery branches supply, the orange and the lemon, the pomegranate, the olive, the almond, and the vine, flourish in wild luxuriance, and pour forth an abundance of luscious fruit. And here, while the eye is never weary of gazing on the glorious blossoms which brighten and adorn the scene, the ear is also ravished with the sweet clear melody of numerous birds, attracted to the palm-grove by its cool shadows, its fruits, and crystal springs.

The valley of the Amazons rejoices in an infinite variety of these beautiful trees. Among them, a foremost place must be given to the Fan-leaved,* which abound in the islets and on the banks of the mighty river and its tributaries. Their stems are huge smooth cylinders, three feet in diameter, and about a hundred feet high. Their crowns consist of enormous clusters of fan-shaped leaves, whose stalks alone measure seven to ten feet in length.

Nothing in the vegetable world, we are told, can be more imposing than this grove of palms. No underwood obstructs the view of the long perspective of towering columns, which forces on the spectator's mind the remembrance of the long-drawn aisles of Gothic cathedrals. The crowns, densely packed together at an immense height overhead, shut out the rays of the sun; and the gloomy solitude beneath, where every sound has a strange reverberation, can be compared to nothing so well as a solemn temple. In such a scene it is meet that

* Mauritia flexuosa.

the soul, "on Devotion's wing," should mount to God!

Humboldt has christened the Mauritia flexuosa the "Tree of Life." It is the chief, almost the only nourishment, he says, of the unconquered nation of the Guaranis, at the mouth of the Orinoco, who skilfully stretch their mats—woven from the nerves of the leaves—from one trunk to another, and during the rainy season, when the Delta is inundated, live like apes on the tops of the trees.

These habitations are partially roofed with mud; the women light their household fires on a flooring of the same material; and the traveller, ascending the river at night, gazes astonished on the hundred spiral shafts of flame and smoke which seem kindled in the very air!

But not only with a habitation does the Mauritia supply these savages; it also feeds them. Before the flowers are developed, the trunk affords them a farinaceous pith, like sago; the sap provides wine and "the joys of Bacchus;" the fresh fruits, covered with scales like fir-cones, yield them nourishment, whether they eat them after the full development of their saccharine principle, or when they simply contain an abundant pulp.

The fruit was first brought to England by Sir Walter Raleigh. The tree does not attain maturity in less than 120 or 150 years.

The Assai palm * deserves mention on account of its edible properties. The fruit, which is perfectly round, and about as large as a cherry, contains but a

* Euterpe oloracea.

small quantity of pulp, lying between the hard kernel and the skin. With the addition of water, the pulp forms a thick, violet-coloured beverage, which stains the lips like blackberries, and is universally drank by the Indians of the Tocantins. The tree itself rises, without knot or blemish, to a great height. The outer part of the stem is as hard and as tough as horn; split into narrow planks it is used for the walls and flooring of the Indian huts.

A noble palm grows in the neighbourhood of Santarem, which the natives call *Bacába.** It grows to a height of forty to fifty feet. The crown is of a shining glossy emerald-green, and of a singularly flattened or compressed shape; the leaves being arranged on each side in nearly the same plane. The fruit ripens towards the end of the winter, and the natives manufacture from it an agreeable liquor, by rubbing off the pulpy coat of the nuts and mixing it with water. The beverage resembles milk, and possesses a piquant nutty flavour. As the Bacába, on account of its smooth stem, is very difficult to climb, the natives, whenever they want to quench their thirst with its fruit, cut down, and thus destroy —with the wasteful thoughtlessness of all savages— a tree which has taken a score or two of years to grow.

The *Urucurí*† is another Brazilian or Amazonian palm, and one of singular beauty. It flourishes in immense groves under the crowns of the loftier forest trees; the smooth pillar-like stems being nearly all of equal elevation, forty to fifty feet; and the

* Œnocarpus distichus. † Attalea excelsa.

broad, finely-pinnated leaves interwoven above in a natural dome-like vault of ever-fresh greenery. The fruit, which in size and shape resembles the date, is never eaten by the Indians. It is palatable, but not wholesome.

But still more celebrated in Tropical America is the wide-spread *Peach palm*,* called by the Tupé Indians the *Pupunha*. The English name would seem to allude to the colour of its fruit rather than to its flavour, which travellers contemn as "dry and mealy," or like a "mixture of chestnuts and cheese." Vultures devour it eagerly, and hover about the tree, when it is ripe, in noisy and quarrelsome flocks. The Pupunha is a noble ornament to the landscape, being, when mature, from fifty to sixty feet in height, and frequently as straight as a scaffold-pole. A bunch of ripe fruit is a sufficient load for a strong man, and each tree bears several of them. The nut, in good condition, is as large as a full-sized peach, and, if boiled, will bear comparison with an Irishman's delicacy—a mealy potato. In the neighbourhood of Egra, where the Pupunha is carefully cultivated, it is thus prepared for table, and eaten with treacle or salt. A dozen of the seedless fruits make, it is said, a good meal for a grown-up person.

It is astonishing to what a variety of uses the Amazonian Indians apply the palm. It provides them with house, food, drink, raiment, salt, implements, weapons, fishing tackle, and even musical instruments. The rafters of their huts are formed, perhaps, of the straight and uniform palm called *Leo-*

* Gulielma speciosa.

poldina pulchra; the *Caraná* is brought into requisition for the roof; and the split stems of the *Iriartea exporiza* furnish the doors and frame-work. The wide bark which grows beneath the fruit of another species is woven into an apron. The comb with which many of the males adorn their heads is made from palm wood, and their fish-hooks from its spine. Caps for the head, and cloth for the loins, are manufactured from the fibrous spathes of the *Manicaria saccifera*. These, too, supply the native with his hammock and bow-strings. Various species of palms yield oil and edible fruit; from eight kinds an intoxicating liquor can be distilled; and from the *Jará assú*, by burning its small nuts, he procures a substitute for salt. From the spinous processes of the *Patawá* he makes his arrows, and arms himself with lances and harpoons from the *Triatea ventricosa*. The long blow-pipe through which he hurls the envenomed dart at birds and animals comes from the *Setigera* palm; from the stems of various trees he fashions the harsh, bassoon-like, musical instrument employed in his "devil-worship;" and, finally, the great woody spathes of the *Maximiliana regia* provide him with cooking-vessels.

In Ceylon and Malabar one of the principal palms is the remarkable *Talipot*, *Talipat*, or Umbrella-bearing palm,* which frequently attains the extraordinary elevation of 100 feet; is straight as a giant's spear; five feet in circumference at the base, and tapering towards the summit, where it terminates in a magnificent crown of enormous palmate plaited leaves

* Corypha umbraculifera. It is also called the Great Fan Palm.

Each leaf, near the outer margin, is divided into numerous segments, and united to the trunk by spiny leaf-stalks. It usually measures about eighteen feet in length, exclusive of the leaf-stalk, and about fourteen feet in breadth; so that a single leaf will form an excellent canopy for a score of men. It is consequently employed for many important purposes, such as roofing houses or making tents. The Singalese noble, on state occasions, is always followed by an attendant bearing above his head a richly ornamented Talipat leaf, which can be folded up, like a fan, into a roll of the thickness of a man's arm, and is wonderfully light. In Malabar, the leaves are used as a substitute for paper, the characters being inscribed with an iron stylus, but they undergo a preliminary process of boiling, drying, damping, rubbing, and pressing. The oil employed in colouring the writing preserves them from insects, but changes with age, so that a Singalese determines the date of a book by carefully smelling at it!

Above its crown of leaves the Talipat, at the age of thirty or forty years, raises an erect pyramid of flowers, of a bright creamy hue, but disagreeable odour. At first they are enclosed in a hard sheath, from which, when matured, they extrude themselves with a loud noise. To this peculiarity Moore alludes in the following lines:—

> "Hearts where, slow but deep, the seeds
> Of vengeance ripen into deeds,
> Till, in some treacherous hour of calm,
> They burst, like Zeilan's giant-palm,
> Whose buds fly open with a sound
> That shakes the pigmy forest round!"

The fruit is abundant, globose, and about an inch and a half in diameter. As soon as it has ripened the tree decays, and in two or three weeks lies rotten on the ground.

Vegetable ivory, now manufactured into many ornamented articles, is the hardened albumen of the Corosso,* first made known in England by Sir William Hooker. It is clear and liquid at first, then milky and sweet, and finally solid. The stem of the tree which produces the Corosso nuts is so dwarfed that they lie in clusters upon the ground, while its enormous tufts of pinnated leaves attain the height of twenty feet. The Corosso is a native of the sheltered and romantic valleys which nestle among the Peruvian Andes.

Wax is obtained from several species of the Palmaceæ, as from the *Ceroxylon*, or Wax palm, discovered by Humboldt in South America, which grows to a height of 180 feet, and the *Camanba*, † whose fan-like leaves are coated with a yellow wax.

From the *Calamus verus* we obtain the well-known canes called ratans; and the *Sago palm*, ‡ which flourishes in the swampy districts of the East, supplies us with a farinaceous food of great value. The *Corypha Australia*, a native of Victoria in Australia, yields a profusion of fan-shaped leaves, which are employed in the manufacture of straw hats. This noble tree attains the stature of 140 feet.

The Palm oil largely used in the manufacture of soap and candles, and in the preparation of the

* Phytolephas macrocarpa. † Corypha cerifera. ‡ Sagus farinifera.

THE AUSTRALIAN PALM.

peculiar compound with which the wheels of railway-carriages are greased, is expressed from the nuts of the *Elais palm*, a native of Guinea. The palm-tree worms, the larvæ of a kind of beetle, eaten in Surinam as a delicacy, flourish on the *Areca oleracea*. The *Areca*, or Catechu palm, yields the celebrated Betel nuts, so largely masticated by the Hindus. From these nuts our chemists obtain an astringent decoction, useful in dyspepsia, and many other diseases.

What would become of the wanderer in the deserts of Arabia and Barbary, if Providence suddenly decreed the extinction of the *Date palm?** Thousands of human beings would inevitably perish, for the inhabitants of Fezzan live wholly upon its saccharine and delicious fruit for nine months of the year. In Egypt, Arabia, and Persia, it forms the principal food of the people, and a man's wealth is computed by the number of date palms he possesses. When dried, the fruit becomes an important commercial staple. Cakes of dates pounded and kneaded, until solid enough to be cut with a hatchet, supply the provision of the African caravans on their toilsome journey through the sun-lighted Sahara. The young leaves, or palm cabbage, are eaten by the Persians and Arabs, who also distil a species of wine from the sap, by fermentation. A single palm will yield three or four quarts daily for a fortnight, after which the quantity diminishes, and the tree gradually dries up. The date stones or seeds are roasted as a substitute for coffee, or ground for the sake of their

* Phœnix dactylifera.

oil, and the residuum given as food to cattle. Bags and mats are made out of the leaves; the fibres supply a rude rough cordage; and the leaf-stalks all kinds of basket and wicker work.

The Date palm is the palm tree alluded to in Scripture, and in the oases of the Great Desert springs up, a fountain of life, for the refreshment of the traveller and the sustenance of the Arab nomade. It generally attains a height of fifty feet, is crowned with a crest of from forty to eighty glaucous pinnated leaves, and flowers at the age of twelve years.

In Egypt we meet with the *Doum palm*, a tree of shorter stature, but remarkable for the repeated forkings of its stem. From the sweet and yet pungent flavour of its fruit, it has been popularly called the Gingerbread Tree; but to an European stomach the gingerbread would prove sadly difficult of digestion. The kernel resembles ivory, and the natives fashion it into beads and other small ornaments.

Both the Date and the Doum palm are found in Egypt, but the former disappears as the traveller descends the Nile, and enters Nubia. Generally speaking, it may be said that the Doum is the Egyptian, as the Date is the Saharan palm tree. Its value is not so great as that of its famous congener, nor are its uses so various; but then the Egyptian is less dependent upon it than the Arab upon the Date. To the inhabitant of the Sahara the latter is food, comfort, wealth, nay, life. It is easy to understand, says a French writer, the gratitude cherished by the Arab towards this tree, which thrives in the sandy waste, draws sustenance from brackish water fatal to

THE DOUM AND DATE PALMS.

almost every other plant, preserves its freshness when all around it decays and withers under the rays of an implacable sun, and resists the tempests which bow its flexible crest but cannot tear up its solidly-planted roots. It may be said, without exaggeration, that a single tree has peopled the Desert; that, without it, the nomade tribes of Western Africa must cease to exist.

What the Date palm is to the Arab, the *Cocoa-nut palm* * is to the Polynesian. Originally it would seem to have been a native only of the Indian coasts and South Sea Islands, but it is now diffused over all the tropical world. There are about eighteen known species, of which only one, the cocoa-nut itself, does not belong to America, but flourishes best in the neighbourhood of the sea-coast. It is the crown and glory of the coral islets which stud the sapphire expanse of the Pacific Ocean; its cylindrical and slender stem, about two feet in diameter, and from 60 to 100 feet in height, with its crest of green, drooping, pinnated leaves, generally sixteen to twenty in number, and from twelve to twenty feet in length, forming a conspicuous ornament of the tropical landscape—of

> "The studded archipelago,
> O'er whose blue bosom rise the starry isles;"

and justly entitling it to the poet's praise, as

> "The loftiest Dryad of the woods,
> Within whose bosom infant Bacchus broods."

The uses of this tree are manifold, and its valuable

* Cocos nucifera.

properties claim man's gratitude. Its hard, agate-like, polished timber, known as Palmyra and Porcupine wood, is prized by the cabinet-maker; the hard nut which encloses its fruit the savage carves into handsome bowls and goblets; the milky liquid within has a sweet and delicious flavour, and is very wholesome, refreshing, and digestible; the fibrous husk can be woven into sails and cordage, or used for stuffing mats and cushions; the terminal bud, or Palm cabbage, is delicate eating; the central part of the stem, when young, affords a sweet and excellent food; the fermented sap yields the spirituous liquor so well known as arrack; the dried leaves can be employed for thatch; and every boy knows that the nut itself is a popular and justly-prized dainty.

Commercially speaking, the most valuable product of this all-important tree is the oil or butter obtained from its kernel, and largely used in Europe in the manufacture of stearine candles. In the East it is employed as an unguent, and for illuminating purposes. It is obtained by pressure of the kernel, or by boiling it over a slow fire. Seven or eight nuts will supply one quart. It is liquid in tropical climates, but in colder temperatures solidifies into a white, butter-like oil. Compression separates it into a more liquid part called *olein*, and a more solid part known as *cocosin*, or *cocostearin*.

The Cocoa palm ripens in about seven years, and continues productive for seventy or eighty, each tree bearing annually from eighty to one hundred nuts.

The Double cocoa-nut (Cocos de Mer) of the Seychelles Islands, which, in the early days of maritime enterprise, was regarded as a marvel, and originated a score of fables, is the fruit of a palm of a wholly different genus.* It was originally found floating on the waves of the Indian Ocean, and as its birth-place could not at first be discovered, became enveloped in an atmosphere of mystery. As a supposed talisman against poison and infectious diseases, it was eagerly sought after; and a good nut would fetch the enormous sum of £150. It was said that only one tree in the world produced this rare and wondrous fruit—"Solomon's Nut" was the popular appellation—and that its roots were fixed deep in the ocean-bed, while a griffin kept watch and ward over the treasure, as the Dragon over the Hesperidan apples. But in 1768 it was discovered by two French officers, Captain Duchenin and M. Barré, growing plentifully in the Seychelles Islands; and was ascertained to be the fruit of a palm, with a straight slender stem, 100 feet high, which requires upwards of a century and a quarter to reach maturity. The whole tree possesses the useful properties of the family to which it belongs, and flourishes only on two islands in the Seychelles group, which are named Praslin and Curieuse.

What rice is to the Hindu, what wheat is to the European, is the Banana † to the inhabitants of the tropical islands. They would perish without it; or be reduced to feed, like the beasts, on the herbage of the fields. But the banana supplies them with a

* Loidoicea Seychellarum. † Order Musaceæ.

wholesome and abundant food, with a pleasant drink, with a valuable medicine, with materials for clothing; in a word, with almost all the necessaries of their simple and easily contented life. It is now understood to be a variety of the plantain; the one bearing the technical name of *Musa sapientum*, the other of, *Musa paradisiaca*—both appellations testifying to the esteem in which the plant is held.

For Musa sapientum, "of the wise men," alludes to a statement by Theophrastus that its fruit was the daily fare of the wise men of India; and Musa paradisiaca, to a tradition that it was identical with the Tree of Knowledge of Good and Evil which flourished in the garden-groves of Eden.

> "A goodly tree,
> Laden with fruit of fairest colours mixed,
> Ruddy and gold."

The name of *Musa* is derived, we are told, from the Arabic word *moz*, a plantain; and the genus comes from the Cape of Good Hope and the islands of the great Eastern Archipelago, where it fattens and flourishes beneath an unclouded sun. Its present range is almost universal, and it will even thrive in regions where the thermometer descends to 45°. It grows most freely in humid localities, and in spots sheltered from the wind; for its large floating leaves, 6 feet long and 2 feet broad, of the brightest green, are so delicately woven, that the lightest gust of air will rend them into fragments. These leaves yield a remarkably fine flax, which is manufactured into fleecy muslins. The process is thus:—

The fibres of the petioles * are easily pulled out, and separated with a knife; they are washed in three or four waters, and bleached and dried on linen ex-

THE BANANA PALM.

posed to the sun; they are then stretched in every direction. After this, they are macerated for an

* The petiole is the stalk of the leaf.

hour in lime-juice, which renders them perfectly white, and fit for spinning; or, if left in a flocky state, they are made into tinder or wadding.

From the stem of the banana a peculiar juice is distilled, which acts as an admirable remedy in cases of diarrhœa.

The fruit of the banana, or Musa sapientum, is shorter and rounder than that of the Musa paradisiaca, or plantain. When ripe, it glows like gold externally, and within mellows into a soft creamy hue. Stewed in claret, or fried in butter, it makes a dainty dish to "set before a king." Dried in the sun, or in an oven, and pounded, it can be manufactured into a nourishing kind of bread; as a whitish and fragrant meal, it will keep for a long time, and is not inferior to porridge. In Guiana it is called *Conquin-tay*.

There is more succulence in the plantain than in the banana. It is a native of East India, but must have been imported into America soon after its discovery by Columbus, since its fruit formed a staple article of food early in the sixteenth century; and now its varieties are scattered over the whole of that great continent.

The stem of the plantain is usually fifteen or twenty feet high. The leaves are very large, frequently ten feet long and three broad; so that one leaf makes a very sufficient shelter from the sun. It is propagated by suckers; and a sucker attains maturity about a year after it is planted. After fruiting, the stem is cut down; but the plantain does not need renewing for nearly twenty years.

Numercus are the uses of this important esculent. We have spoken of its fruit as an article of food: a decoction of it yields a pleasant beverage; the top of the stalk, boiled, is an excellent vegetable; the leaves are employed for packing, and for thatch; and the fibre for textile purposes, and cordage.

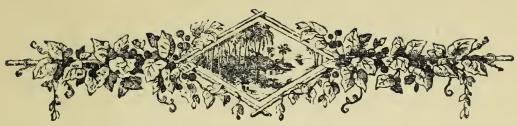
Its importance as a staple of nutriment may be inferred from Humboldt's calculation that the food-produce, compared with that of the potato, is as 44 to 1, and with that of wheat, as 133 to 1. A square space of one thousand feet will grow forty or fifty plants; and one acre of ground will yield sufficient support for fifty men. Take a patch of land. Cultivate it with wheat, and it shall nourish its tiller; plant it with bananas, and it shall maintain half a company of soldiers!

Some wild species of the plantain flourish in many parts of the East. One kind, Musa Troglodytarum—common enough in the fair islands of Polynesia—bears its clusters erect and aloft, like a chieftain's plume of feathers, and not pendent, like all other varieties. In the golden Philippines there lives a species of Musa bearing a green unsavoury fruit, whose stem supplies the well-known Abaca or Manilla hemp.

The gorgeous Strelitzias, which are now found in many English hot-houses, having been imported from the Cape of Good Hope, belong to the order *Musaceæ*. Their flower-stalks spring, like lances, from the centre of numerous leaves, borne upon long petioles, which are ensheathing at the base. Their flowers are orange and dark blue. The Heliconia,

which possesses an edible root, and the Urania,* a plant of more than ordinary beauty, are also members of the banana tribe. The leaves of the latter have been compared to broad sword-blades; they are eight feet long, a foot broad, and rise straight upwards, alternately, from the top of a stem five or six feet high.

* Urania Amazonica or Wild Banana.



III.

The Banyan Tree.*

THE poet Southey, in a well-known passage of the "Curse of Kehama," describes this wonderful tree with as much felicity as truth. The quotation is somewhat hackneyed, yet may be new to our younger readers. The scene is "a green and sunny glade" in a tropical forest,—

"And in the midst an aged banyan grew.
It was a goodly sight to see
That venerable tree;
For o'er the lawn, irregularly spread,
Fifty straight columns propped its lofty head;
And many a long depending shoot,
Seeking to strike its root,
Straight, like a plummet, grew towards the ground.
Some on the lower boughs, which crossed their way,
Fixing their bearded fibres, round and round,
With many a ring and wild contortion wound;
Some to the passing wind, at times with sway
Of gentle motion swung;
Others of younger growth, unmoved, were hung
Like stone-drops from the cavern's fretted height.
Beneath was smooth and fair to sight,
Nor weeds nor briars deformed the natural floor;
And through the leafy cope which bowered it o'er
Came gleams of checkered light.
So like a temple did it seem, that there
A pious heart's first impulse would be prayer!"

The Banyan, or Pagod tree, is a native of sunny Hindustan and Cochin-China, and frequently attains

* Ficus Indica: order Urticaceæ.

an almost incredible size. I have read of one which had no fewer than 350 stems, each stem equal in girth to a large oak, besides 3000 smaller ones; the whole forming a canopy of foliage overspreading an

THE BANYAN TREE.

area of 1700 square yards, and covering a space capable of containing 7000 persons. That is to say, this one tree extended over as much ground as the transept of the Crystal Palace, or St. Paul's Cathedral. Its leaves are shaped like a heart, about five or

six inches long; and its fruit resembles, in shape, size, and colour, a rich scarlet cherry, growing in pairs from the axils of the leaves. The branches frequently extend over two acres horizontally, straight out from the trunk, and send forth long straight shoots or arms, which root themselves in the ground, and form props—like smooth pillars, covered with silvery bark—for the boughs, and simultaneously supply them with additional moisture from the earth. The main trunk will measure about 28 feet in girth, and 60 to 80 in height. The props or stems frequently possess a circumference of 10 to 14 feet. In the branches the Bonzes, or Hindu hermits, plant their huts; and in their pleasant shadow the traveller protects himself from the ardour of a tropic sun.*

In Moore's "Lalla Rookh," the procession of the princess is represented as encamping under a banyan —under one of those holy trees, says the poet, whose smooth columns and spreading roofs seem to destine them for natural temples of religion. The Hindus convert them into temples, placing their idols under its shade; wherefore they call it the pagod tree. In some places, says Pennant, it is believed to be the haunt of spectres, as the ancient spreading oaks of Wales have been of fairies; in others are erected, beneath the shade, pillars of stone, or posts, elegantly carved, and ornamented with the most beautiful porcelain, to supply the place of mirrors.

* So Milton:—

"The bended twigs take root, and daughters grow
About the mother-tree, a pillared shade."

As for the fruit, only birds and monkeys eat it; but its milky juice supplies a kind of caoutchouc, and the wood of the larger stems is useful from its toughness and lightness.

Allied to the banyan is the *Pippul tree*,* a native of Ceylon and the Indian mainland, where it receives a considerable amount of veneration—Vishnu being supposed to have sprung into life under the pippul, and Buddha to have enjoyed its shade. The leaves are heart-shaped; 8 inches long, and 6 broad, at the broadest part. Unlike the banyan, its branches do not send forth any roots; but it yields a caoutchouc juice. Most of the Indian caoutchouc, however, is obtained from the various species of Ficus, or fig tree—such as the *Ficus elastica* and *Ficus toxicaria;* but it is far inferior for commercial purposes to that of the *Siphonia elastica*, an American tree of which we shall hereafter have occasion to speak.

* Ficus religiosa; order Urticaceæ.

IV.

The Mangrove Tree.*

THE Mangrove is a genus of plants belonging to the natural order Rhizophoraceæ. All its individuals are tropical, and all natives of the coast, especially of estuaries and the mouths of great rivers, where they flourish in the mud—extending their closely intertwined roots even down to low-water mark, and often presenting to the voyager an impassable barrier. Most of the species possess the peculiar property of sending down roots from their branches; and thus they spread with great rapidity over an immense area, forming thick mangrove forests, the resort of myriads of aquatic birds, of innumerable legions of crabs, and of hosts of shell-fish, which adhere to their branches. The leaves are of a dark glossy green, which contrasts pleasantly with the long narrow scarlet pods. The wood is hard and durable. From the roots, when left bare by the receding tide, a sickly odour arises; and the vicinity of a mangrove forest is always cursed by the deadly malaria. It is partly to this circumstance must be attributed the unhealthy character of the estuaries of the African rivers.

* Order Rhizophoraceæ.

The seeds germinate while still attached to the parent branch. The pod opens at the bottom; the young plant, with its long thick radicle, extends itself, and rapidly grows downwards; until the fruit falls off, penetrates into the mud, and in due time rises into a lofty tree.

The whole number of species known is about twenty. The fruit of the common mangrove (*Rhizophora mangle*) is sweet and eatable; and its fermented juice yields a light wine.

Kingsley, in his "Westward Ho!" has painted a mangrove forest very graphically.

The shore, he says, sank suddenly into a low line of mangrove wood, backed by primeval forest. The loathy floor of liquid mud lay bare beneath. Upon the endless web of interarching roots great purple crabs were crawling up and down. The black bank of dingy leathern leaves above; the endless labyrinth of stones and withes (for every bough had lowered its own living cord, to take fresh hold of the foul soil below); the web of roots, which stretched far away inland;—all seemed one horrid complicated trap for the voyager; there was no opening, no relief—nothing but the dark ring of mangroves, and here and there an isolated group of large and small, parents and children, bending and spreading, as if in hideous haste to choke out air and sky. Wailing sadly, sad-coloured mangrove-hens ran off across the mud into the dreary dark. The hoarse night-raven, hid among the roots, startled the voyagers with a sudden shout, and then all was again silent as a grave. The loathly alligators, lounging in the

THE MANGROVE TREE.

slime, lifted their horny eyelids lazily, and leered upon you as you passed with stupid savageness. Lines of tall herons stood dimly in the growing gloom, like white fantastic ghosts. All was foul, sullen, weird as witches' dream.

Happily, no landscape dark and drear as this pollutes our British shores, and threatens the mariner with delirious death!

V.

The Wellingtonia Gigantea.

"Overhead up grew
Insuperable height of loftiest shade,
A sylvan scene ; and, as the ranks ascend
Shade above shade, a woody theatre
Of stateliest view."

MILTON.

THIS noble tree, indisputably the giant and monarch of the vegetable world, is a native of California, where it was discovered in 1852 by a Mr. Dowd. It was first described by Dr. Lindley.* When it has attained its full growth, its dimensions are truly colossal. What does the reader think of a tree 450 feet high—more than twice the height of the Monument of London—which could not find room to rear its branches beneath the dome of St. Paul's—and whose huge trunk measures 116 feet in circumference? It is difficult for the liveliest imagination to realize any adequate conception of such a leviathan. And if such a task be one to tax the fancy, what shall we say of a forest of these verdurous colossi, stretching over leagues and leagues of densest shade!

And yet such a scene there is at Calaveras, in California, where the awe and astonishment of the

* It is now scientifically known as the *Sequoia gigantea*, and belongs to an old genus (*Sequoia sempervirens*) of the *Taxodium* family.

THE WELLINGTONIA GIGANTEA.

traveller are excited by the gigantic masses of the Mammoth Tree Grove. They are situated in lat. 38° N. and long. 120° 10′ W., at an elevation above the sea-level of 4370 feet. Within an area of fifty acres are found one hundred and three trees of goodly proportions, twenty of them exceeding seventy-five feet in circumference, and yet these are saplings, not half arrived at the maturity of their treehood! The neighbouring squatters will point you out a stump, which affords sufficient area for a public meeting, and on which—so runs the record—thirty-two persons danced four sets of cotillions at one time, without coming into chance collision. This stump measures twenty-five feet across, without the bark. It engaged the labour of five men for twenty-two days to fell it, and this was accomplished not with axe or saw, but by boring it off with pump augers. The bark was removed to England, and put up in the Crystal Palace as a visible representation of a mammoth tree. During the conflagration of 1866 it was unfortunately destroyed.

The largest tree now standing has been named, from its immense size, two breast-like protuberances on one side, and the number of small trees of a similar species adjoining, the Mother of the Forest. It measures in circumference, without the bark,

At the base,	84 feet, or, including the bark, 90 feet.
Twenty feet from the ground,	69 feet.
Seventy feet from the ground,	43 feet 6 inches.
One hundred and sixteen feet from the base,	39 feet 6 inches.
Height to the first branch,	137 feet.
Total height,	321 feet.

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Figures sometimes give one but a poor idea of magnitude, but let the reader think of a tree which rises to a greater height than pillar or column in Great Britain before it throws off a single branch!

Near this huge tree lies prone upon the ground the majestic bark of the "Father of the Forest," worthy of its title from its superiority in size. It measures in circumference, at the roots, 110 feet. It is 200 feet to the first branch; the whole of which surpassing length is hollow, and forms a tunnel, where a man can walk erect. Its height, when standing, is computed to have been 435 feet. Three hundred feet from the roots, and where it was broken off by striking against another large tree, it measures eighteen feet in diameter.

Now let us turn our attention to a graceful pair, apparently inclining towards one another, and therefore appropriately named "The Husband and Wife.' These are of the same dimensions—at the base, about 60 feet in circumference; and in height, about 250 feet.

The "Hermit" stands alone in silent grandeur, with a tall shapely trunk shooting upwards like a colossal monument to an elevation of 318 feet, and 60 feet in circumference.

Another giant has been christened "Hercules:" its girth is 95 feet, and its height 312 feet. In the hollow trunk of the "Burnt Tree"—which is prostrate, and hollow from repeated burnings—a person can ride on horseback for sixty feet! It is supposed, when standing, to have been 103 yards high.

A bent, broken, and melancholy-looking tree is

the "Old Maid" of this family of Anakim; 261 feet high, and 59 feet in circumference. It has a suitable companion in the "Old Bachelor," a rough and scathed old trunk, 298 feet in height and about 60 feet in girth.

The "Siamese Twins," at about 40 feet from the ground, divide into two separate trees, and reach an altitude of 300 feet.

Mr. Hutchings, to whose interesting pages we are indebted for most of these details, speaks of the "Pride of the Forest" as "one of the most beautiful trees of this wonderful grove. It is well-shaped," he says, "straight, and sound; and, although not quite so large as some of the others, it is, nevertheless, a noble-looking member of the grove—275 feet in height, and 60 feet in circumference."

The "Mother and Son," standing side by side, form a picturesque couple, and may well rejoice in each other's almost perennial vigour. The former is 315 feet in height, and the latter 302 feet. Unitedly, their circumference is 93 feet.

The "Guardian," a tree of noble aspect, is 312 feet high by 81 feet in circumference. You may contrast it with the "Beauty of the Forest," which soars upward, with stately crest, to the height of 307 feet, while measuring round the trunk five and sixty feet.

There are also the "Two Guardsmen," 300 feet high; the "Horseback Ride," a hollow and prostrate trunk, 150 feet long; "Uncle Tom's Cabin," 305 feet high, and 91 feet in circumference; and the beautiful group of the "Three Graces," which, to-

gether, measure 92 feet in circumference at their base, and are each nearly equal in height, or about 295 feet.

It was at first the opinion of the highest botanical authorities that each concentric circle of the trunk, or about two inches in diameter, was the growth of one year; and as nearly three thousand concentric circles, it was supposed, might be counted in the trunks of the fallen trees, one might reasonably conclude that they were in existence three thousand years ago. Or that they were but fresh green saplings when Rameses the Great was adorning Thebes with architectural marvels; had shot upward, in the glory of their lusty vigour, long before Romulus became the founder of the Roman state; and counted their age by centuries what time the redemption of mankind was accomplished on "the tree of Calvary." But later researches have shown the number of concentric rings to be exaggerated, and that the actual age of the trees is about eleven hundred years.

It was at first supposed that the mammoth grove of Calaveras was the only group of trees of the kind in existence. But in 1855 similar "vegetable wonders" were discovered at Mariposa, and in the neighbourhood of the sources of the Frezno. In the Mariposa wood, one large stem, whose top has been stripped of its branches, bears the poetical name of "Satan's Spear," in allusion to Milton's well-known comparison—

> "To equal which, the tallest pine,
> Hewn on Norwegian hills to be the mast
> Of some great ammiral, were but a wand."

Its circumference is 78 feet.

Another huge trunk, with a dilapidated crest, looking strangely like the ruin of some feudal castle, is known as "The Giant's Tower." It is 70 feet in circumference. In close contiguity occur two trees of a very different character; one, shapely and slender, and crowned with a luxuriance of beautiful foliage; the other, a weirdly monster, has a scarred and knotted trunk, with branches all gnarled and broken—these are "Beauty and the Beast." The so-called "Rambler" measures, at its base, 102 feet; from base to top, 250 feet. Two giants, named "The Sisters," are respectively 82 and 87 feet in girth, and each is about 225 feet in height.

The entire group at Mariposa comprises three hundred trees, covering a triangular area of between four and five hundred acres. About one half of these have been measured by American travellers, from whose report we may select a few items.

One tree,	102 feet in circumference.
One tree,	97 feet in circumference.
One tree,	92 feet in circumference.
Three trees,	76 feet in circumference each.
One tree,	72 feet in circumference.
Three trees,	70 feet in circumference each.
One tree,	68 feet in circumference.
One tree,	65 feet in circumference.
One tree,	63 feet in circumference.
Three trees,	63 feet in circumference each.
Two trees,	60 feet in circumference each.
One tree,	58 feet in circumference.

And so on, down to 40 feet in circumference.

Some six or seven miles from Mariposa, as the crow flies, is the Frezno grove, consisting of about five hundred trees of the Taxodium family, on about as many acres of undulating forest-land, dense, shadowy, and magnificent. Here the two largest

measure 81 feet each in circumference, and the others from 51 to 75 feet.

In no other part of the world, we believe, do the Sequoias attain to such imposing dimensions. The *Sequoia sempervirens*, popularly known as the Red Wood, which extends from Upper California to Nootka Sound, almost rivals its fellow-species, and is frequently found more than 300 feet high. Both kinds have been introduced into England, where, as hardy evergreen trees, they are admired intruders in the garden. But to witness all their majestic beauty, they must be seen in their native habitat, where they stand, like giant warders, to guard the solitude of the long untrodden wilderness.

"God of the forest's solemn shade!
The grandeur of the lonely tree,
That wrestles singly with the gale,
Lifts up admiring eyes to Thee;
But more majestic far they stand,
When, side by side their ranks they form
To wave on high their plumes of green,
And fight their battles with the storm!"

VI.

The Dragon Tree of Orotava.

OUR readers will be prepared, when they peruse the poetically-sounding title of this chapter, for some marvellous legend of enchanter, Paynim, warrior-knight, and "laidly beast." We naturally associate ideas of romance and mystery with that peculiar creation of romance, the dragon; from the monster which was slain by St. George of Cappadocia, to the Dragon of Wantley, which, as everybody knows, was gallantly encountered and killed by More of More-Hall. But the Dragon-tree* of Orotava is not distinguished by any myth or fable, though it possesses a certain historic interest, and is remarkable for its hoar antiquity.

Orotava is a quiet but picturesque little town, of some nine thousand inhabitants, situated on the north coast of Teneriffe—one of the Canary Islands—in the immediate shadow of the mighty Peak, and embowered among gardens, groves, and vineyards.

Here grows a noble individual of the Lily tribe; a huge tree, which, when Humboldt measured it, was sixteen feet in diameter, and still bore its annual burthen of foliage, flowers, and fruits. It

* Dracæna Draco.

THE DRAGON TREE OF OROTAVA.

had attained this notable magnitude as early as the fifteenth century; a gigantic, rugged, umbelliferous tree, which the Guanches—the aboriginal inhabitants of the Canary Islands—had, at one time, connected with their religious rites.

The stem of the dragon tree, however, is generally short in proportion to its thickness, and its head consists of numerous diminutive branches, which terminate in tufts of sword-shaped leaves. The substance which it yields—an opaque resin, brittle, smooth, of a deep reddish-brown colour, and powerful as a styptic—is called dragon's blood.

Species of the Draco are found in China, Northern Africa, and New Zealand. The "dragon's blood" of commerce is chiefly procured from the *Pterocarpus Draco* of South America; the *Calamus Draco*, or East Indian palm; and the red Sandal-wood tree of the East Indies.

VII.

The Bread-fruit Tree.*

"The bread-tree, which, without the ploughshare, yields
The unreaped harvest of unfurrowed fields,
And bakes its unadulterated loaves
Without a furnace in unpurchased groves.
And flings off famine from its fertile breast,
A priceless market for the gathering guest."

BYRON.

SCARCELY inferior in utility and importance to the palms is the Bread-fruit tree, a native of the islands of the Indian and Pacific Oceans, and a genus of the natural order, as botanists call it, of *Artocarpaceæ*.

It is a slender tree, forty to fifty feet high, and for half its height without a single branch. Its leaves, a foot and half in length, are large, pinnatifid, dark green, and lustrous. Its fruit, composed of consolidated fleshy calices, is covered with a roughish rind, is of an oval shape, about the size of a child's head, and contains a number of almond-like nuts. At first the fruit is green; when half ripe, brown; and when mature, of a golden yellow. A short thick stalk attaches it to the branches of the tree, and it hangs either singly or in groups of two or three together. The pulp, in its early stage, is white, mealy, and consistent, like new bread.

* Artocarpus incisa.

THE BREAD-FRUIT TREE.

The old navigator, Dampier, describes this tree in his usual quaint fashion :—

"It grows," he says, "on a large tree, as big and

high as our largest apple trees: it hath a spreading head, full of branches and dark leaves. The fruit grows on the boughs like apples: it is as big as a penny loaf, when wheat is at five shillings the bushel: it is of a round shape, and hath a thick, rough rind: when the fruit is ripe, it is yellow and soft, and the taste is sweet and pleasant. The natives of Guam use it for bread. They gather it, when full-grown, while it is green and hard; then they bake it in an oven, which scorcheth the rind and makes it black; but they scrape off the outside black crust, and there remains a tender, thin crust; and the inside is soft, tender, and white, like the crumb of a penny loaf. There is neither seed nor stone in the inside, but all is of a pure substance like bread. It must be eaten new; for if it is kept above twenty-four hours, it grows harsh and choaky, but is very pleasant before it is too stale. This fruit lasts in season eight months in the year, during which the natives eat no other sort of food of bread kind. I did never see of this fruit anywhere but here (the island of Tahiti, or Otaheite). The natives told us that there is plenty of this fruit growing on the rest of the Ladrone Islands; and I did never hear of it anywhere else."

The reports which were circulated of the beneficial properties of this tree, induced the West Indian merchants to petition the British government for its introduction into the Antilles. For this purpose the *Bounty*, a ship of 215 tons, was equipped, in 1787, and, under the command of Lieutenant Bligh, despatched to Otaheite (or Tahiti, as it is now, and

more properly, called) to obtain a cargo of trees, for transport to the West Indies. The object of the expedition was frustrated by the outbreak of the famous mutiny. Bligh and eighteen of his officers and crew were flung into a small boat, in which they successfully accomplished a voyage of 3618 miles to the isle of Timor, while the mutineers, after various misadventures, established themselves on Pitcairn's Island. A second expedition, however, was more successful, and the bread-fruit tree was happily naturalized in the West Indian Archipelago. But of late it has been superseded by the banana, which the negroes consider of a better flavour.

VIII.

The Cedars of Lebanon.

"It was a cedar tree
That woke him from the deadly drowsiness;
The broad round-spreading branches, when they felt
The snow, rose upward in a point to heaven,
And, standing in their strength erect,
Defied the battle-storm."

SOUTHEY.

TO the natural order or family which botanists distinguish as Coniferæ, Conifers, or Cone-bearing trees, and to the genus Abies, or, according to other authorities, to the genus Cedrus, belongs the stately Cedar.

There are many varieties of this noble tree. In the south of Europe, and especially on the warm slopes of the Pyrenees, flourishes the Spanish cedar. In the sunny air of the West Indian Islands—those fair Antilles so lavishly endowed by Nature—bloom the rich flowery panicles of the Barbadoes cedar, which rears its solid trunk to the height of seventy or eighty feet. Its wood is remarkably fragrant, but not so its fruit, its bark, or its leaves; these all exhale a disagreeable odour. Nor is it a true cedar, only resembling the cedrus in the resinous properties of its timber. The red cedar, which clothes with

THE CEDARS OF LEBANON.

dense shadowy groves the heights of California, is a species of fir. But a true cedar is the magnificent Deodar,* the Devadara or god-tree, which the Hindus regard with peculiar veneration; and which, at an elevation of from 7000 to 12,000 feet, spreads about the craggy sides of the Himalayas in deep, dark, mysterious forests. It frequently rears its pillar-like trunk some 150 feet above the ground, and rejoices in a mass of far-spreading branches which might shelter a battalion of soldiers. Then there is the cedar of Algiers,† which flourishes on the lower ridges and spurs of the Atlas Mountains. Both these species, according to Dr. Hooker, are identical with the cedar of Lebanon. The deodar is well known in our British gardens, but rather as an ornamental shrub than as a tree. At least, the writer has never seen any considerable specimens of it. Its wood is durable, close-grained, hard, and yet so resinous that its splinters burn like candles. Its turpentine is used medicinally in Hindustan; its tar and pitch for various purposes; and its wood, when polished, for articles of furniture.

But the finest species of Cedrus is the far-famed cedar of Lebanon,‡ so called from its native home in the mountainous regions of Palestine. It has enjoyed a distinguished reputation from the remotest antiquity. The ancients highly valued its timber on account of its durability; for, such is the pungency of its bark, no insect will venture to touch it. Its Hebrew name *erez*—compact or compressed—refers to the excessive firmness of its roots. In Holy Writ

* Cedrus Deodara. † Cedrus Atlantica. ‡ Cedrus Libani.

we meet with numerous references to its admirable characteristics.

Thus the prophet Ezekiel describes it (xxxi. 3, 5) as: "A cedar with fair branches, and with a shadowing shroud, and of a high stature.... his height was exalted above all the trees of the field, and his boughs were multiplied, and his branches became long because of the multitude of waters, when he shot forth."

The Psalmist refers to its far-spreading branches: "She sent out her boughs unto the sea, and her branches unto the river" (Ps. lxxx. 11).

Jeremiah when he purposes to build "a wide house, and large chambers," would "ciel it with cedar" (xxii. 14).

The fragrancy of its wood caused it to be employed for purification: "And the priest shall take cedar wood, and hyssop, and scarlet, and cast it into the midst of the burning of the heifer" (Num. xix. 6).

It was with cedar wood that Solomon adorned the interior of the great Temple, and he sent to Hiram, King of Tyre, for "cedar trees out of Lebanon." And Hiram replied to the Jewish sovereign's demand: "I will do all thy desire concerning timber of cedar, and concerning timber of fir. My servants shall bring them down from Lebanon unto the sea: and I will convey them by sea in floats unto the place that thou shalt appoint me, and will cause them to be discharged there, and thou shalt receive them" (1 Kings v. 8, 9). So the glorious House of the Lord was covered with beams and boards of cedar, and within, the walls were built with boards of cedar,

and the floor, and the walls of the ceiling; there was no stone seen—all was cedar—and cedar finely carved with gourds and festoons of flowers.

Cedar was also employed by David for the palace which he built at Jerusalem (1 Chron. xiv. 1); and by Jeshua and Zerubbabel in the second temple which was erected in the Holy City after the captivity.

It was on the loftier heights of Lebanon that the cedar flourished—flourished in immense green forests, whose shadow stood out dark and deep against the radiant Eastern sky. Alas, how are the mighty fallen! The woodlands which spread over leagues and leagues, which not even the axes of Hiram's 30,000 workers could destroy, though they laboured for many months, are now reduced to one scanty grove, which, according to Dr. Hooker, contains but four hundred trees. And of these four hundred, not above twelve of the ancient race remain. The others are offshoots, of comparatively modern date. But some of the patriarchs are venerable with an old age far exceeding the old age of the European forests. Several are estimated at from four hundred to eight hundred years old; the age of the twelve elders is beyond computation. Of the younger trees, the youngest will number two hundred years.

This cedar grove, sole relic of the Lebanon glories, is situated high up on the western slope of the mountain-range, ten hours south-east from Tripoli, and at an elevation above the sea-level of 6172 feet. The space which it covers does not exceed half a dozen acres, or about three-quarters of a mile in

circuit; and nowhere else is the scenery so ruggedly grand or so Alpine, nowhere else are the proportions so gigantic, or the ravines so profound and awful.

The wood, bark, cones, and even leaves of the Lebanon cedar are saturated, says Dr. Thomson, with resin. The heart has the red cedar colour, but the exterior is whitish. The branches are thrown out horizontally from the parent trunk, with a slight upward inclination, which the Arabs consider a sign of its superior intelligence. This inclination, they assert, is always greater before a fall of snow, as if the tree anticipated, and prepared to receive, its burthen. Climb into a cedar tree, and you meet with a succession of verdurous floors or terraces circling around the trunk, and gradually decreasing in dimensions as you ascend. The beautiful cones seem the natural ornaments of this delightful green flooring.

Most of the Lebanon patriarchs are about fifty feet in height, and their girth is represented by the same figure. One, however, measures sixty-three feet in circumference. They spread out their branches to an enormous distance, so that beneath their umbrageous canopy a darkness like that of twilight prevails even at noonday.

The Arabs call them "the saints." They worship them with a deep reverence, and believe that a severe retribution will assuredly overtake the rash or presumptuous individual who may venture to lay rude hands upon them. Once a year, at the Feast of the Transfiguration, the Greeks, Maronites, and Armenians wind up the mountain-side in long proces-

sion, and celebrate mass on a plain stone altar erected in their shade.

The cedar is known by its horizontal branches, which divide irregularly into branchlets; by its dark green pointed leaves; its erect oval cones, about four inches long, and three in diameter; and its reddish fragrant wood. It loves a dry open soil, yet requires that its roots should find their way to an abundance of water. It was introduced into England towards the close of the seventeenth century, and has become permanently naturalized. It is even found in a flourishing condition as far north as Inverness. At Norbury Park, near Leatherhead, in Surrey, the cedars have attained a noble growth, and form—

> "A pillar'd shade,
> Upon whose grassless floor of red-brown hue,
> . . . ghostly shapes
> May meet at noontide—Fear and trembling Hope,
> Silence and Foresight—Death the skeleton,
> And Time the shadow."

Those of Deepdene, near Dorking, are not less magnificent—"ranging in colour from the black green of the yew to the silvery gray of the deodara." Whoever has floated down "the regal Thames" between Weybridge and Walton, must remember the noble old trees which adorn its grassy bank near the ancient site of Ham House. They are among the principal ornaments of the luxuriant landscapes which lie about Sheen and Richmond. At Lord Middleton's seat of Peperharow, four giants flourish which were planted in 1736. One of them measures fifteen feet in circumference at three feet from the ground. Some of its branches span seven feet, and

its dark verdant terraces of leaf extend for nearly 100 feet horizontally. Not less worthy of note are those at Goodwood, in Sussex. One thousand were planted by the third Duke of Richmond in 1761. Only 158 now remain, but these are of unusual size. The largest boasts of twenty-five feet girth.

I have said that the wood of the cedar defies the attacks of insects. Its durability may not be doubted, for it was found in the Temple of Apollo, at Utica, undecayed, after a lapse of two thousand years. Its pitch was formerly used in embalming; and Gerard, the old botanist, declares it was good for the eyes, and, when mixed with vinegar, cured "worms in the ears and the bites of serpents."

The finest cedar in France is that which Daubenton, the naturalist, planted in the Jardin des Plantes of Paris. It may be termed an historical tree. A chance shot, during the celebrated siege of the Bastile, struck off its terminal branch, and consequently arrested its upward growth. As some compensation, however, it spread out its great green branches horizontally with renewed vigour, and still flourishes—a stately and honoured patriarch.

IX.

The Baobab.*

ARCHBISHOP TRENCH, in his learned and thoughtful book "on the Parables," has some very judicious observations on the love of nature. The lover of a truth, he says, which shall be loftier than himself, will not be moved from his faith that however man may be the measure of all things here, yet God is the measure of man—that the same Lord who sits upon his throne in heaven does with the skirts of his train fill his temple upon earth—that these characters of nature which everywhere meet his eye are not a common but a sacred writing—that they are hieroglyphics of God; and he counts this his blessedness, that he finds himself in the midst of such, and because in the midst of them, therefore never without admonishment and teaching. This entire moral and visible world, he continues, from first to last, with its kings and its subjects, its parents and its children, its sun and its moon, its sowing and its harvest, its light and its darkness, its sleeping and its waking, its birth and its death, is, from beginning to end, a

* Order Sterculiaceæ

mighty parable, a help at once to our faith and our understanding.

In the vegetable kingdom there are parables enow of which poets and divines and philosophers have often made excellent use. These "characters of nature," these "hieroglyphics of God," have received all the illustration that the loving faith and gentle wisdom of the purest spirits could give them. Not a tree, not a plant, not a flower, from the stately oak to the modest violet, from the graceful palm to the shrinking mimosa, but has afforded a theme for thought, a suggestive fountain of fancy and imagination. There flourishes a tree on the luxuriant bank of many a West African river which might easily be made to point a moral and adorn a tale. Its size is immense; seen from afar, its huge trunk looms against the hot sky like a rock; the most massive buttress with which human hands ever sought to strengthen a palatial building is but as a reed when compared with it. You would think that its timber was the solidest, the hardest, the most impenetrable of any tree in the world. Yet, in truth, its wood is singularly soft and fibrous; there is no grain, no hardness in it; you may scoop it as you would the pith of a cane. Now, do you want an illustration? Take one from history, and compare it to some mighty empire, which to all appearance is a colossal giant—imperishable and unconquerable—and yet, examined more closely, proves to be without any genuine solidity, and is neither enduring nor compact. Thus there are "tongues in trees;" and every forest, every grove, is full of eloquent voices, which speak

to all who have ears to hear the lessons of love and wisdom.

Do you know upon what tree I have based this little sermon of mine, dear reader? Probably not; the Baobab, wondrous as it is, enjoys no such world-wide reputation as the cocoa-nut or the bread-fruit tree. One reason for its limited fame is the comparatively recent date of its introduction into Europe.

There was born at Aix, in Provence, on the 7th of April 1727, one Michel Adanson; born of French parents, but descended from a Scottish stock. He was educated at Paris. At an early age he manifested a warm love of natural history studies, and was never weary of investigating the properties of plants or the habits of animals. With such tastes it was fortunate for him that his masters were Reaumur, the inventor of the well-known thermometer, and Bernard de Jussieu, the eminent naturalist. When only twenty-one years old, he embarked for Senegal, considering that there a vast and unoccupied field lay before him in the study of the productions of that part of Africa. He spent five years in the colony, and gathered together very valuable and extensive collections of plants and animals. Then he returned to France, and about 1757 published an account of his labours and adventures, entitled, "Histoire Naturelle du Senegal. In this work was embodied a description of the remarkable tree to which I have referred, and which the Africans know by the name of the Baobab.

Before I proceed to say a few words about its marvels, I may state that Adanson spent a long and

virtuous life in the pursuit of his favourite studies; that he suffered great privations during the stormy time of the French Revolution; and that he died on the 6th of August 1806, in the eightieth year of his age.

As a monument to his memory, botanists have named the Baobab, in their scientific nomenclature, *Adansonia digitata*. The genus Adansonia, to which it belongs, and of which it forms the only known species, is included in the natural order *Sterculiaceæ*, and distinguished by a simple deciduous calyx (or cup), a very long style, with numerous stigmas, and a wooden capsule (or shell-like covering) containing a farinaceous pulp. To this same order belong the Silk-Cotton trees, such as the Bombyx and the Eriodendron, and the Theobroma Cacao, which yields the well-known and nutritious *cocoa*. Mucilage, therefore, seems the predominating property of all the trees of the Sterculiaceæ family.

The Baobab is the largest known tree in the world. Not that it is the loftiest, for in height it is surpassed by many, but that its trunk is the most massive, often attaining a diameter of from 20 to 30 feet, and a circumference of from 90 to 100. Its branches are like ordinary forest trees in thickness, and frequently 70 feet in length, while they form a hemispherical head of 120 to 150 feet in diameter, like a monster-dome or canopy of foliage. The leaves are digitate, that is, divided like fingers; the flowers white and exceedingly large, on drooping stems or peduncles of a yard long.

The trunk of the Baobab is rugged, and rent into

wide furrows, which afford securely-sheltered nooks for sheep and other animals. The branches, as may

THE BAOBAB.

be supposed, spread over a vast area of ground, and their fruit are suspended from the under side, clothed

with a very rich, deep-sea green, downy substance, which induced Captain Clapperton to compare them to "so many velvet purses." The popular English name for them is "Monkey-Bread;" because they are much relished by the monkeys, who conceal themselves among the interlacing boughs, and find a pleasant asylum in the overlapping foliage.

The rind of the Monkey-Bread is not hard. Within, the dark seeds are affixed to numerous fibres, and the whole is embedded in a farinaceous, cream-coloured, sub-acid pulp, which the Africans consume as food, and employ to thicken their soups.

The medicinal properties of the tree are important. The dried pulp, mixed with water in certain proportions, is useful in cases of dysentery. The leaves, when dried and powdered, are called *Lalo* by the negroes, who use them in this state as a remedy for diarrhœa, fevers, and other diseases, and to check excessive perspiration. The expressed juice of the fruit, mixed with sugar, is considered a specific in putrid and pestilential fevers—for every poison, you see, God mercifully provides an antidote!—or, taken with water, it forms a most refreshing beverage.

I have already pointed out that the timber of this colossal tree is not what might have been expected from its huge dimensions; it is soft, fibrous, yielding, and almost wholly destitute of carbon. The Baobab loses its leaves annually, just before the heavy rains set in; and then its mighty trunk, and scarcely less mighty branches, all bare, and desolate, and sombre, present a very impressive spectacle. It stands like an aged monarch, shorn of all regal splendour; like

some patriarchal chief, who has stripped himself of his pomp in a time of sorrow and lamentation.

There can be no question that the Baobab attains to a wonderful longevity. Some botanists have gone so far as to assert that there are individuals now existing which witnessed the roaring floods of the great Deluge! Adanson met with a tree, about 32 feet in diameter, whose age, from the concentric layers of its trunk, he estimated at 5500 years. I should suppose there was some error or exaggeration in these statements; but, at all events, among the wonderful "characters of Nature," and among the Wonders of the Vegetable World, I think we may justly rank the colossal Baobab.

X.

The Traveller's Tree.

IT is impossible to exaggerate the beauty of the Madagascar forests. Their tropical luxuriance astonishes the European, accustomed to the sober stateliness of the woods of Norway, the piny wildernesses of the Apennines, or the beech groves of our English hills. Gigantic ferns mingle with rare feathery grasses, and over all rise the elegant columnar trunks of crested palms, while the wonderful Lattice-Leaf Plant spreads its delicate reticulated folioles over the dimpling surface of the sequestered streams. The flora of Madagascar is remarkable for its novelties. This *Lattice-Leaf Plant*—Water Yam, Lace-Leaf, or Ouvirandrano,* as it is variously called—has no fellow or congener in any other clime. Its root-stock, about nine inches long, and as thick as a man's thumb, wears a light brown skin, with a white central farinaceous pith, which renders it no unsavoury food. The flower-stalks, peeping just above the water of the running brooks in which the plant delights, terminate in bright forked spikes of flowers; but the most curious feature is the leaf, which lies just under the surface

* Ouvirandra fenestralis.

THE TRAVELLER'S TREE.

of the water, is of an elongated oval form, and woven —literally woven—of fine tendrils, crossed at right angles, so as to resemble the most exquisite network. You cannot conceive of anything more perfect in design or execution. It would put to shame the productions of the most celebrated looms.

The *Vacquois, or Vacoa* (Pandanus utilis), is also worthy of notice. Its leaves are singularly tenacious, and are used by the Malagays in the manufacture of sacks or bags for the transport of valuable goods. Large quantities are exported annually.

The *Cerbera Tanghin* (or Tanghinia venenifera)* bears a seed of peculiarly poisonous properties. It is no larger than an almond, and yet it is said that one would be sufficient to poison twenty persons. Its active principle is called tanghicin, and, like strychnine, it produces the most violent convulsions, followed by asphyxia. The Malagays use it in their trials of ordeal. Just as in the Dark Ages the accused were made to walk over red-hot ploughshares, or flung into ponds, and their guilt or innocence determined by the result of the cruel experiment; so the Tanghin seed is administered in Madagascar to the unfortunate criminal. If, by vomiting, he reject it from his stomach, he is declared innocent; if death ensue, he is pronounced guilty. And yet it is evident that his chances of escape will depend solely on his strength of constitution, or on the connivance of his judges, who might find the means of administering a powerful emetic.

* Order Apocynaceæ, or Nux Vomica tribe.

The island-forests also supply numerous gum-yielding essences; among others, the Copal-tree, which furnishes the gum resin employed in the arts under the name of copal; and the Vahea, whence a much-esteemed kind of caoutchouc is extracted. Numerous lianas, and a multitude of epiphytous plants, twine round the trunks of the forest-trees, and interlace among each other in apparently inextricable confusion. We can only refer to the *Abrus peccatorius*, whose red and black seeds, commonly known as Angola pease, are woven into pretty necklaces; the *Angræcum sesquipedale*, an orchidaceous plant with large irregular flowers; the *Angræcum fragrans*, whose odorous leaves furnish a pleasant and wholesome infusion; and the gorgeous *Heritiera argentea*, whose tall trunk is adorned with a profusion of silver-white leaves.

But the most notable of the vegetable wonders of Madagascar is the Traveller's Tree.* Its stem resembles that of the plantain, with which it is otherwise allied; but it sends out its leaves like wings, or like a large expanded fan, only on two opposite sides. As the lower leaves gradually decay, in an aged tree the undermost clusters will be twenty to forty feet above the ground. There will generally be found a score of these leaves on a vigorous trunk, the stalk being six to eight feet, and the bright, emerald-green oblong blade four to six feet in length. The fruit grows in three or four bunches; forty or fifty fruit in each bunch; and each fruit containing a quantity of the silkiest fibre imaginable, of a beautiful

* Urania speciosa, or Ravenala Madagascariensis: Order Musaceæ.

purple tint, and enclosing thirty or thirty-five seeds. The leaves are much used for the thatch, and the leaf-stalks, twisted together, for the walls of the islanders' huts. But the property which has procured for the Urania its distinctive appellation of the Traveller's Tree, resembles the beneficent arrangement of the pitcher-plants: its petioles always contain water, even in the hottest and driest period of the year; and the wayfarer, if he feels athirst, has only to pierce the thick part of the base of a leaf-stalk, to obtain fully a quart of pure and refreshing liquid. Surely the goodness of the Creator can never be over-praised! Everywhere we meet with fresh and abundant illustrations of his inexhaustible bounty; on the sea-shore, in the desert-sand, among the depths of the virgin forest, we trace the eternal evidence of a wisdom which is infinite, of a compassion which knows no limit.

"Happy who walks with Him! whom what he finds
Of flavour or of scent in fruit or flower,
Of what he views of beautiful or grand
In nature, from the broad majestic oak
To the green blade that twinkles in the sun,
Prompts with remembrance of a present God."

XI.

The Victoria Regia.*

OF all the Lily tribe,—beautiful exceedingly as is every member of it,—none can compare with the glorious Victoria Regia, which, had it blossomed in fairy-land, would undoubtedly have been hailed as Queen of the Flowers.

The Nymphæaceæ brighten the lakes and streams and woodland pools of most of our European countries, where the pale water-lily, nestling its shining blooms on the azure wave, is the favourite of poet and artist; but it is in tropical climes that its varieties reach their more magnificent development. These plants are distinguished by their fleshy root-stocks, which lie embedded in the ooze at the bottom of their aquatic haunts, while their large, long-stalked, heart-shaped leaves spread themselves like shields on the surface of the water. The flowers have usually four sepals, and numerous petals and stamens. The seeds contain a farinaceous albumen, and are said to contain narcotic and sedative properties. They form an article of diet with some savage races.

More than fifty species are known. The Victoria

* Victoria.

regia was discovered by Sir Robert Schomburgk, during his travels in Guiana and Demerara. At the

THE VICTORIA REGIA.

close of a summer's day, worn with hunger and fatigue, he rested himself on the rocky bank of the river Berbice, at a point where it had broadened into

a sheltered and beautiful lake, surrounded by a belt of luxuriant foliage. To his delight and wonder he found its waters covered with this glorious lily, in every stage of development, from the conical brown bud whose opening leaves just disclosed the cream-coloured petals within, to the deep crimson glory of the full-blown flower. There, too, were the wrinkled leaves as yet but partially expanded, and there the broad, smooth, emerald shields, stretched out upon the tide, of a size and texture to support an infant Puck—some of the flowers, too, glistering like gigantic crowns, and measuring four feet in circumference. He felt rewarded for all his toil by the discovery of a plant so beautiful and so superb, and hitherto unknown to European botanists. In compliment to the British sovereign it was named the *Victoria regia*, and immediately took its place among the rare flowers of the botanic world.

By dint of great care some plants were imported into England. One was placed in the charge of the late Sir Joseph Paxton, at the Duke of Devonshire's gardens, Chatsworth; and the late architect of the Crystal Palace frequently told the story of the delight with which he and his noble patron, while conversing together in the conservatory specially devoted to it, suddenly beheld its buds unfold and its beautiful petals reveal themselves.

There are now several specimens of the Victoria in the United Kingdom, as in the Botanical Gardens of Glasgow, and especially at Kew. The Victoria-house, as it is called, in the latter famous Gardens, is always crowded by admiring visitors, who surround,

with eager interest, the circular tank, thirty-six feet in diameter, in which the Queen of Flowers displays her splendour.* There, too, are appropriately exhibited several other species of the Nymphæaceæ, as well as the "sacred bear" of India, the enchanted Lotus, whose story we shall hereafter tell, and the Egyptian papyrus.

* The Spaniards call it the "Water Maize." They collect the seeds, and eat them roasted. The fruit is a sort of globular berry, covered with formidable prickles.

XII.

The Cactus Tribe.*

THE *Cactæ* or *Cactaceæ* form a very numerous family, including nearly five hundred known species, while the real number is undoubtedly greater. They are all, however, natives of America, and most of them of the intertropical regions of the New World. Here they flourish in extraordinary vigour, and with their strange fantastic forms lend a peculiar and most original character to the landscape. They are among the plants which the poet describes as adorning the scenery of that romantic isle where first the vision of Columbus was fulfilled:—

> "Here, blue savannas fade into the sky;
> There, forests frown in midnight majesty;
> Ceiba and *Indian fig*, and plane sublime,
> Nature's first born, and reverenced by Time!"

They are all distinguished by the same generic qualities: the stems are fleshy, either simple or branched, and often very soft and succulent. Many, when advanced in years, have a sort of woody centre, composed of rings which increase yearly, and covered with a layer of inner bark, so that the fleshy, juicy

* Order Cactaceæ.

THE CACTUS TRIBE.

portion is in itself only a layer of bark. Instead of leaves, they usually present strange clusters of hairs or prickles. One species alone, the Pereskiæ, wear those folial decorations which to an English eye seem an essential part of shrub or plant; but in wondering at their remarkable conformation and the exceeding beauty of their flowers, the lack of leafiness is soon forgotten.

It is impossible to describe the weird grotesqueness of shape which they often exhibit. One might be pardoned for supposing them to be freaks of Nature. If seen only on the canvas of the artist, we should undoubtedly refer them to the ingenious exercise of his imagination. The Torch thistle may be compared to a spear throwing off many minor javelins; the stem of the Pereskiæ to a thorny imitation of a palm tree, for it bears a thick crown of branches on a straight column, thirty feet in height; the Mesembryanthemum inflexum covers the ground with an infinity of bright terminal flowers; the Euphorbia grandidens reminds you of a stately candelabrum; the Opuntia, or Indian fig, divides its stem into prickly leaf-like sepals; while the Melocactus, or Melon thistle, swells out into a finely marked globular gourd, adorned with branching flowers. There are some with flat, some with angular, others with channelled stems; many creep and climb up taller trees; not a few drag their slow length along the ground. They are all hardy, vigorous, capable of enduring prolonged thirst; their epidermis, or outer skin, being of so tough a nature, that it is neither affected by a dry atmosphere nor a

burning sun. And though there are several species which ascend the Andean slopes even to the very border of the clime of eternal snow, most members of the family love to plant themselves on a dry rocky soil, and there, under a sky which is almost always hot and fierce, they spread and thrive, until they cover leagues of barren plain with their wonder and their beauty; for not even the desert places of the earth will God leave without abundant evidence of the wondrous wealth and depth of his creative power.

One of the commonest species is the *Cactus opuntia*, which rapidly forming an almost impenetrable fence, is much valued by American settlers as a protection for their enclosures. One of the most useful is the *Melocactus mammillaris*, which abounds on the waterless plains of North America, and is there esteemed by the traveller with as sacred a love as the well in the Sahara by the Arab caravan. Its stem affords from half to a full pint of clear limpid water. Judge, therefore, of the delight with which the parched, gasping, thirsting wayfarer, scorched by an unclouded sun, and spent with fatigue, alights upon a group of these vegetable fountains, these natural reservoirs of life! One of the most beautiful is the *Night-blowing Cereus*,* well known in our English conservatories, and whose bright flowers expand only at midnight, closing them at dawn, never to open again; reminding us of a poet who gives one precious song to the world, and is silent for ever after.

* Cereus speciosissimus.

"Children of night! unfolding meekly, slowly,
To the sweet breathings of the shadowy hours,
When dark-blue heavens look softest and most holy,
And glow-worm light is in the forest-bowers;
To solemn things and deep,
To spirit-haunted sleep,
To thoughts, all purified
From earth, ye seem allied;
O dedicated flowers!"

The *Euphorbium* tribe are sometimes distinguished as a separate order, but there can be no question that they are closely allied to the Cactaceæ, both in properties and form. There are not less than twenty-five hundred species, and a majority of these flourish in tropical America. The principal feature in their physiology is the acrid milky juice which they contain, as in the Caoutchouc: thus the milk of the Euphorbium thymifolia is considered a good vermifuge by the Tamúl medicine-men; with that of the E. hectagona the Indians poison their arrows; that of the E. balsamiferum furnishes the Canary Islanders with an agreeable jelly; while that of the Manchineal or Hippomane mancinella yields a deadly venom. It is said that if you take shelter under its boughs during a shower of rain, the droppings from the leaves will produce ulcers and blistering wounds upon your skin. But close beside it ever grows the Trumpet flower,* whose sap is an excellent antidote to the Manchineal poison. Evil never stands alone in this world; good always thrives and blooms in its vicinity, as if to bid us remember that the love of God is infinitely more enduring than his wrath.

* Bignonia leucoxylon.

Resembling the Cacti in singularity of form, though belonging to a distinct order,* is the *Stapelia hirsuta*. It grows near the ground, with strange prickly stems, and brilliantly coloured flowers, attracting the traveller by its quaint shapes and bright hues, but quickly repelling him by its nauseous odour of carrion. Swarms of flies hover around it, or cluster on its petals, just as they might upon some putrid carcass. The different species of Stapeliæ are popularly distinguished by the name of *Carrion flowers*.

In Texas, the traveller meets with several species of the Yucca, of which the handsomest is certainly the *Yucca Treculeana*,† so named after its discoverer, M. Trécul. From its rich tuft of leaves springs a marvellous cluster of white bell-shaped flowers, covering the rocky plains where it grows with beauty. It is frequently found associated with one of the Cacti, the *Opuntia frutescens*, and with the thistle-like *Silphium terebenthinaceum*, whose tall stalk wears at its summit one perfect flower. Another fine Cactus, found in Western Texas, is the *Opuntia microdasys*, a robust thorny plant of fantastic appearance, very common now in English conservatories; and the landscapes are also enriched with the quaint *Cereus Peruvianus;* the globular *Mamillaria rodanthe*, with its rosy blossoms; and the rare *Echinocactus robustus*, not less curious than rare.

* Order Asclepiadeæ. † Order Liliaceæ.

XIII.

Rafflesia Arnoldi.

THE reader who glances at the accompanying illustration will assuredly be of opinion that the Rafflesia Arnoldi * is one of the most curious of plants in appearance. It will probably remind him by its general outline and aspect of some of the wonders of the sea-shore—those strange and many-hued creatures which may occasionally be seen floating in the translucent deep. Certainly it deserves to be included among the Wonders of the Vegetable World, for it is only a *flower;* a flower without stalk or leaf, growing upon the roots of various species of *Cissus*, like a fungus on the bark of a forest tree. It belongs to an order, or family, of parasitical plants called Rafflesiaceæ, which, in its turn, is comprised in a class or division known as Rhizantheæ, or Rhizogens. All the Rhizogens are natives of warm climates; two or three species are found in the south of Europe, but the majority flourish in Africa, and in tropical Asia and America. In their general structure they resemble fungi; and they resemble them, too, in their manner of decay;

* Order Rafflesiaceæ.

but they have the flowers and sexual characteristics of Phanerogamous plants.

The Rafflesiaceæ consist wholly of parasitical plants; that is, of plants which feed upon the nutriment of others, and find their support in the stems and trunks of trees, or, like ivy, in the arid rock and the barren wall of stone. Their seeds may be compared to a mass of sporules; and each flower is both male and female, or hermaphrodite; the germen, stigma, and pistil being the female, and the stamens the male part.

The flower first makes its appearance as a globular, or rather hemispherical swelling of the bark of the Cissus root, and, after the bark has broken, rises up in the form of a large folded cabbage, attaining its full size in about three months. The natives of Sumatra, where it was discovered, call it Krûbut. After it has expanded, it exhales a putrid odour, which attracts swarms of flies, like the so-called Carrion flowers, and induces them to deposit their eggs. The cup, or nectary, measures fully three feet in diameter, frequently weighs fifteen pounds, and will hold ten to twelve pints of fluid. It is, therefore, the largest, as well as one of the most singular, of known flowers.

In the year 1818 Sir Stamford Raffles, an adventurous traveller and distinguished naturalist, who rendered good service to his country in many arduous capacities, was appointed Governor of Bencoolen, a British settlement in the Island of Sumatra. In his suite was Dr. Arnold, a clever man of science On one occasion he had accompanied Sir Stamford

RAFFLESIA ARNOLDI.

and Lady Raffles on an excursion into the surrounding country, but straying a little in advance of them, he was suddenly summoned by a Malay servant, who exclaimed, in tones of astonishment and with gestures of surprise, "Come with me, sir, come! Here is a flower—large, wonderful, beautiful, most wonderful!" Proceeding with the man for about a hundred yards into the jungle, he did indeed descry a strange flower of immense size growing close to the ground, and immediately under the bushes. You may imagine with what delight he pounced upon the treasure. Never did eager child grasp more ardently a longed-for birthday gift! His first impulse was to cut it off, and carry it away; but finding, on examination, that it had adhered to a small root, he succeeded in detaching the whole, and removing it in safety for further investigation. The flower thus discovered was called *Rafflesia* in compliment to Sir Stamford, and *Arnoldi* in allusion to its discoverer. Its colour is a dull red, like brick dust, but relieved by a number of yellowish-white raised spots. The stamens are placed in the centre of the cup, adhering at their base; there are several styles, and the whole flower is invested with scales.

There exist two smaller species in Java, another of the great Indian islands. These are the *Rafflesia Patma*, whose flowers, measuring from fifteen to twenty-four inches in diameter, are valued by the Javanese for their medicinal properties as a styptic in cases of excessive bleeding; and the *Rafflesia Horsfieldii*, whose flowers are only three inches broad.

XIV.

The Caoutchouc Tree.*

FROM the plants of myth and song we return to those of commerce. Caoutchouc is not a poetical article, and though its uses are manifold and important, we do not suppose that the liveliest imagination could fashion a legend out of them. Its introduction into the arts, sciences, and manufactures—for it figures in each—was comparatively recent. It was first imported into Europe about 1730; and, forty years later, Dr. Priestley astonished the scientific world by informing them that "he had seen a substance excellently adapted to the purpose of wiping from paper the marks of a black-lead pencil." It was then sold at the rate of 3s. the cubic half inch. About 1791 its elasticity recommended it to notice as a material for clothing, and one Samuel Peat obtained a patent for India-rubber cloth. Its waterproof qualities soon brought it into more extensive use; and as its numerous valuable properties were successively discovered, it was manufactured into pipes and tubes, cylinders and cushions, cloaks and canes, rings, varnish, combs, paper-knives, bottles, goblets—in fact, into a hun-

* Siphonia elastica.

dred useful articles; so that, whereas we only imported, in 1850, 7617 cwts., in 1864 we imported 71,027.

THE CAOUTCHOUC TREE.

Caoutchouc is diffused, in the form of minute globules, in the milky juices of plants, and especially

in those of the natural orders *Apocynaceæ*, *Artocarpaceæ*, *Asclepiadaceæ*, *Euphorbiaceæ*, *Moraceæ*, and *Papayaceæ*. It is only in warm climates that it occurs in sufficient abundance to become available for commercial purposes, and the caoutchouc employed in Europe comes either from the East Indies or South America.

In the East Indies it is principally obtained from the India-rubber tree,* which has been successfully transferred to our English "crystal palaces," from the woody rocks and hills of Sylhet. It is a tree of more than average stature, abounding in large oval leaves, very thick and shining. You might shelter a herd of cattle under one or two of these noble trees. The milky juice is extracted by making incisions through the bark and down to the very wood, cutting all round the stem or branch, at intervals of twelve or fifteen inches. Thirty ounces of caoutchouc are distilled from thirty ounces of the juice.

But the caoutchouc tree, properly so called, is of South American birth, and belongs to the natural order *Euphorbiaceæ*. It is one of the principal ornaments of the immense forests of Guiana and Brazil, where it rears its tall, straight, column-like branch to the height of sixty feet, terminating in a noble crown of leafy branches. Its juice is obtained through incisions in the bark, and collected on pear-shaped or bottle-like moulds of clay, which are afterwards dried in smoke, so as to receive a black colour. Layers of juice are successively applied and black-

* Ficus elastica; order Moraceæ.

ened, until the proper thickness is secured; and when the caoutchouc has sufficiently united, the mould is broken, and the india-rubber remains, fit for use.

Caoutchouc of the finest quality is supplied by the fine Sumatran tree, *Urceola elastica;* and other caoutchouc-bearing trees are: In South America, Collophora utilis,* Cameraria latifolia;* in East Indies, Willughbeia edulis;* and in Madagascar, Vahea gummifera.*

Chemically speaking, caoutchouc is a compound of carbon and hydrogen. It is a tenacious, fibrous, and remarkably elastic substance, which hardens at the temperature of freezing water (32° Fahrenheit). It softens in boiling water. If suddenly stretched out to seven or eight times its proper length, it becomes warm; and if kept so for several weeks, loses nearly all its elastic characters. In this state it is cut into thin strips and used as "elastic." It is insoluble both in water and alcohol, but may be dissolved by ether, chloroform, naphtha, lavender, sassafras, oils of turpentine, benzole, crude petroleum, and bisulphuret of carbon. It fuses at 248° Fahrenheit, and at 600° becomes volatilized, yielding a liquid called *caoutchouchine* or *caoutchisine*, remarkable for its great solvent properties.

* Order Apocynaceæ.

XV.

The Pitcher-Plants.*

WHEN spending an hour or two in that realm of true enchantment, the Royal Botanic Gardens at Kew,—"Armida's Gardens," more full of wonder and beauty than the fable-land which Tasso, the Italian poet, has sung of,—we have observed with what eager interest lads and lasses have gathered round the specimens there collected of the *Nepenthes* or *Pitcher-Plants*. It is probable that but few of those who examine them with such curious eyes know anything of their real character, or could positively tell you whether the curious appendages distinctive of these plants are leaves or flowers. It is not good to be ignorant of such things, and learned in Greek Verbs or Algebraic Equations. For the reader's benefit, therefore, we supply a few particulars.

Botanically speaking, and indulging, as botanists are forced to do, in scientific language, the Nepenthes form the only known genus of a natural order of exogenous plants called Nepenthaceæ, consisting of herbaceous or half shrubby plants with dicœcious flowers. Like many other vegetable wonders their

* Nepenthaceæ.

native home is the warm region of India and China, where they flourish in swampy places. There are twenty species, and they are most abundant in the tropic islands of Borneo and Sumatra; islands where Nature seems to have lavished all she could conceive of curious and rare. One species only, the *Nepenthes distillatoria*, is found in Ceylon; two belong to Madagascar; and another flourishes on the Khasian mountains.

> There, neath a radiant sun and glowing sky,
> The green Nepenthes, all athirst, supply
> Their blossoms with fresh moisture evermore,
> Renewing ay the unexhausted store.

The pitchers, from which they derive their name, are supported by a stalk, which apparently springs from the apex of the leaves, or they may be, perhaps, the true leaves themselves. On this point botanists differ. Dr. Hooker regards the pitcher as simply a prolonged modification of the midrib of the leaf, and we think he is right. It is a capital pitcher, however, with a light-lifting lid, and as capable of holding water as any vase ever fabricated by potter! As the plant grows old, the lid opens, and never closes again.

The water contained in these strange natural goblets is secreted by certain small glands at the base of the cavity, and in sufficient quantity to drown the flies and other insects which fall into it. Doubtless it provides in some mysterious way for the nourishment of the flower which secretes it, and which thus satisfies its wants with its own moisture! A beautiful and interesting object is one of these

remarkable plants, with its bright green colour, and its "light and airy appendages."

The species chiefly cultivated in English hot-houses are *Nepenthes distillatoria*, *Nepenthes Rafflesiana*, and *Nepenthes ampullacea*. Their pitchers differ in size and shape, some being six or eight inches long, and finely marked with rich brown spots. But in every form of life, animal or vegetable, there exists a type of superior beauty and magnitude, and this, among the Nepenthes, is found in a recently-discovered Bornean species, named the *Nepenthes Rajah*, by Dr. Hooker of Kew, in honour of a gallant Englishman, Sir James Brooke, the Rajah of Sarawak. The pitcher is twelve inches long by six broad; the blade of the leaf, eighteen inches long by eight broad; and the midrib nearly or quite as thick as the middle finger. It is unfortunate that, as yet, no living specimen has reached England; but an imperfect leaf and pitcher, dried, may be seen in the Kew museum.

The young classical student must not confound these plants with the *Nepenthes* of Homer—the magic potion (*νηπενθής*) which removed from the soul all remembrance of pain and sorrow. This was probably some preparation of hemp.

The water collected in the pitchers has, when boiled, the odour of baked apples; and, on evaporation, leaves a residuum of minute crystals of binoxalate of potash.

So much for the true pitcher-plants; but Mr. Jackson observes that others occur in families totally unconnected with the Nepenthaceæ. Thus in the

Side-saddle flower order,*—an order peculiar to North America,—herbaceous perennial plants growing in marshy soils,—we have the genera *Sarracenia*, *Darlingtonia*, and *Heliamphora*, all forming perfect but variously-shaped pitchers: with this difference, however, that the pitchers are not appendages to the leaves, but the leaves themselves, united at the edges. It is from the shape of the leaves that the name "Side-saddle flower" is derived. The order has no known properties or economic value.

The pitchers are usually nearly full of water, which we may suppose to be secreted by the plants. They are even better insect-traps than the Nepenthes, for round their mouths lies a glutinous or saccharine exudation, while the portion immediately below is perfectly smooth, but nearer the bottom runs a series of sharp reflexed hairs. The sugar attracts the flies, which incontinently slide down the smooth surface into the water, and are prevented from saving themselves by the hairs. Do the dead insects in any way provide for the nourishment of the plant?

In the swamps of Australia, and, especially, in the vicinity of King George's Sound, English travellers have observed a remarkable little plant, with bright green leaves, and a spike of clustering flowers, called the *Cephalotus follicularis*. It is surrounded by a row of pitchers, which apparently rest on the ground, as if to protect the leaves and flower-spike from injury. The leaves themselves are spoon shaped, and green like the pitchers, which, however, are marked with small brown or purple spots. The

* Sarraceniaceæ.

mouth resembles that of the pitchers of the Nepenthes, having a thickened rim, and being notched in a very regular manner.

But we have omitted one of the most curious of the Sarraceniaceæ—the species called *Darlingtonia Californica*—a perennial herb growing in marshy places in California. Its pitcher is a marvel of vegetable ingenuity.

Near the orifice, says Mr. Jackson, it curves over, forming a perfect hood, and it is from the inner edge of this hood, on the under side, that the true leaf springs.

This leaf is very deeply divided, or two-lobed, the lobes spreading out and hanging downwards. The entrance to the pitcher is under the curved hood, which, to some extent, affords a protection for the orifice; and though, just inside, the circumference is studded with short, sharp hairs, insects have frequently been found dead at the bottom of the pitcher.

From the position of the vaulted hood over the mouth of the pitcher, completely excluding rains, dews, or other atmospheric moisture, botanists have arrived at the conclusion that the liquid found must, as in the case of the Nepenthes and the Sarracenia, be secreted by the plant itself; an arrangement which, we think, the reader will admire as a strange and remarkable provision of Nature.

XVI.

The Egyptian Lotus.*

"The lotus blooms below the barren peak:
The lotus blows by every winding creek:
All day the wind breathes low with mellower tone:
Through every hollow cave and alley lone
Round and round the spicy downs the yellow lotus-dust is blown.
Let us swear an oath, and keep it with an equal mind,
In the hollow lotus-land to live and lie reclined
On the hills like gods together, careless of mankind."

TENNYSON.

UNDER the name of Lotus (Greek, λωτός) the ancients included various plants, mostly belonging to the natural order Nymphæaceæ, and growing in India and Egypt.

The genus which they seem to have had chiefly in view is the *Nelumbium speciosum*, or *Nelumbo*, which is undoubtedly one of the beauties of the vegetable kingdom, and which flourishes spontaneously in the still lakes and calm waters of the Tropics. This plant, which presents a large corolla, tinted with rose and white, was anciently very common in Egypt, but has almost wholly disappeared: a consequence, it is said, of the frequent inundations of the Nile, which have troubled the tranquillity of its watery home, and of too frequent alternations of excessive dryness and humidity. Its rhizomes, or

* Nymphæa Lotus.

underground stems, furnished the Egyptians with abundant sustenance, easily procured. Diodorus Siculus, an old writer, seems to allude to this plant under the name of *Agrostis*, and the Romans called it the Egyptian bean (*faba Ægyptiaca*). Its celebrity reached the ears of the Greeks, who immediately exercised upon it their fertile fancy; and thus arose the myth of the Lotophagi, or lotus-eaters, which Homer has enshrined in the Odyssey. They were, in sober reality, a peaceful and kindly-natured people, inhabiting a district of Cyrenaica, on the north coast of Africa, and living, to a great extent, on the fruit of the lotus, and a wine which they extracted from it. But, according to the Greek poet, when Ulysses visited them in the course of his wanderings over sea and land, his companions, eating of

> "That enchanted stem
> Laden with flower and fruit,"

forgot their native land, their paternal hearths, and sank into a happy state of dreamy listlessness.

> "And all at once they sang, 'Our island home
> Is far beyond the wave; we will no longer roam.'"

Some naturalists suppose this charmful fruit to be the African jujube;* but the Homeric epithet, "nurse of blossom" (ἄνθινον εἶδαρ), seems rather to refer to a shining flower, such as the Nymphæaceæ. If there were truth in the legend, how many languid spirits would gladly partake of a root which could lull them into forgetfulness of their duties and responsibilities!

* Zizyphus Lotus.

The Egyptians made the lotus, in allusion to its aquatic nature and mode of reproduction, their symbol of fertility and life, and in their religious rites it played an important part. Their god Horus, the divine child, personification of the rising sun, was represented by a lotus springing from the depth of the waters, and the wreath which decorated his breast was composed of the flowers and buds of the same plant.

The same idea is current among the Hindus, who designate the Nelumbo under the name of Padma, and take it to be their emblem of life and reproduction. The beauty of the flower has led to their associating it with many of their gods. Vishnu is frequently depicted as reclining on the bosom of the stream. From his navel issues a colossal lotus plant, and from the lotus plant springs Brahma, the creator of the world. Lakshinî, the Indian Venus or goddess of beauty, is surnamed the lotus-born, and the divinity who finds an asylum in the lotus.

The Egyptian lotus, or water-lily, was called by the Egyptians *shnin* or *seshin*, and the Arabs designate it *beshnin*, which is just the Egyptian or Coptic name with the definite article prefixed. It spreads its broad white flower on the wave of the Nile and its tributary rivulets, while the root is eaten by the people who inhabit the borders of Lake Menzalah. The streams and water-courses near Damietta are white with this shining blossom, which rises full two feet above the water. It was the rose of the ancient and mysterious Egypt; it was, and is,

the favourite Egyptian flower, which the women love to weave in their garlands, and bind around their dusky brows. In works of art, such as the prows of boats and the capitals of columns, it is a constantly-recurring ornament.

In Southern India the red lotus is frequently met with. The fable runs, that when Kamadeva (or Cupid) wounded Siva with his arrow, the blood of the latter dropped upon the lily, and changed its hue for evermore. The flower is larger than that of the white water-lily, and Mrs. Graham pronounces it "the most lovely of all the nymphæas."

Moore, in his "Lalla Rookh," has added another to the many poetical associations of this enchanted plant in a charming passage, where he speaks of Cupid, or Love—

> "As bards have seen him in their dreams
> Down the blue Ganges laughing glide
> Upon a rosy lotus wreath,
> Catching new lustre from the tide
> That with his image shone beneath."

This is the Nelumbo, or *Nelumbium speciosum*. In Cashmere and Persia flourishes the blue lotus or blue water-lily,* and the eye of the traveller rests with delight on its starry blossoms

> "When the breeze
> Is making the stream around them tremble!"

Every variety of the water-lily—from the Egyptian lotus, with its wonder-fables, to the beautiful flower that nestles on the calm surface of our English lakes—is exquisitely lovely.

* Nymphæa cerulea.

XVII.

Sensitive Plants.*

"The sensitive plant has no bright flower;
Radiance and odour are not its dower;
It loves, even like Love, its deep heart is full,
It desires what it has not—the beautiful!"

SHELLEY.

THE *Sensitive Plants*, or *Mimosas*, will always be classed among the curiosities of the vegetable kingdom, from that peculiarity of their nature which induces them to shrink and quiver at the lightest touch. When a high wind passes over them, they close their leaves, and fold them, as it were, around their stems, as if its cold breath withered their very sap. The excitability is necessarily not so marked as in animals, yet its presence is undeniable, and the effect sufficiently curious.

There are various species of Mimosas; but, in England, *the* sensitive plant *par excellence* is the *Mimosa pudica*, a native of Brazil, which, like many other foreign blossoms, has become naturalized in our English hot-houses. When touched, it droops in humble shame, like a meek spirit; but, after awhile, gathering up its energies, it once more expands its

* Order Leguminosæ, tribe Cæsalpineæ, genus Mimosa.

gentle leaflets, as the meek spirit will do if left alone in silence. In fact, the Mimosa reads, for all who have eyes to see, an enduring lesson of humility.

> "Weak with nice sense the chaste mimosa stands,
> From each rude touch withdraws her timid hands;
> Oft as light clouds o'erpass the summer glade,
> Alarmed, she trembles at the moving shade,
> And feels, alive through all her tender form,
> The whispered murmurs of the gathering storm;
> Shuts her sweet eyelids to approaching night,
> And hails with freshened charms the rising light."
>
> DR. DARWIN.

Various theories have been propounded to explain this peculiar effect, but the one most in favour among modern botanists appears to be Dr. Dutrochet's :—

"The principal point of mobility," he says, "exists in the little swelling which is situated at the base of the common and partial petioles of the leaves. This swelling is composed of a very delicate cellular tissue, in which is found an immense number of nervous corpuscules; the axis of the swelling is formed of a little knot of tubular vessels. It was ascertained by some delicate experiments, that the power of movement, or of contraction and expansion, exists in the parenchym and cellular tissue of the swelling, and that the central fibres have no specific action connected with the motion. It also appeared that the energy of the nervous powers of the leaf depended wholly upon an abundance of sap, and that a diminution of that fluid occasioned an extreme diminution of the sensibility of the leaves. Prosecuting his inquiry still further, the author ascertains that in the movements of the sensitive plant there are two distinct motions—the one of locomotion,

which results from direct violence offered to the leaves, and occurs in the swellings already spoken of; the other, nervimotion, depending on some stimulus applied to the surface of the leaflets, unaccompanied by actual violence—such as the solar rays concentrated in the focus of a lens. The agency producing this nervimotion is in the ligneous part of the central system, and in certain tubes supplied with nervous corpuscules, and serving for the transmission of the sap."

The *Moving Plant*,* a native of the East Indies, is another interesting member of the same natural order. Its movements differ from those of the mimosa; the leaves having a rotatory, instead of a collapsing or drooping motion. Moreover, the motion is voluntary, for some of the leaflets are never at rest, even when uninfluenced by any external cause. The leaves are ternate, that is, composed of three leaflets; and sometimes one, sometimes two, and even all three of these, will be moving, either steadily or by jerks, in every possible direction.

Sensitive leaves, also, belong to the *Æschynomene viscidula* of Florida, and the *Æschynomene sensitiva* of the West Indies, which open their leaflets during the day, and close them at the approach of night; a fact which is likewise noteworthy in the "night-blowing Cereus."

Venus's Fly-Trap † is a well-known and remarkable example of vegetable irritability. Its native habitat is the North Carolina swamps; but it has been successfully cultivated in our English hot-houses,

* Desmodium gyrans. † Dionæa muscipula; order Droseraceæ

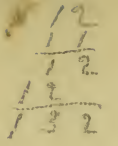
"solely on account of the interest excited by its peculiar movements." It is a tiny plant, with its leaves arranged in a cluster, out of which the flower-spike springs, and each leaf having long-winged foot-stalks.

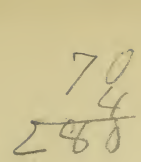
But the irritable or sensitive part is the true leaf, which is situated at the apex of the winged petiole; it is divided by a continuation of the mid-rib into two nearly simicircular lobes, whose edges are fringed with a single row of stiff hairs. Three soft, fine, hair-like bristles occupy the centre of each lobe, on the upper side, and are arranged in the form of a triangle. These are so exquisitely sensitive that the lightest touch will bring the two halves of the leaf closely together. If, then, a fly, or some other small insect, settle or crawl upon the leaf, and touch the small hairs, the two lobes immediately collapse, "completely and securely enclosing the intruder, until he is either dead or has ceased to struggle, when the sides again open and resume their former position." This is "the trap" which has given name to the plant.

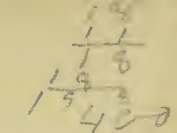
The *Sundews*,* of which three species are indigenous to the British Isles, also possess a slight irritable tendency. The genus is a singular one: the leaves are covered with vermilion-tipped, glandular hairs, whose apex exudes a colourless viscid fluid, which attaches itself to the wings of flies or other minute insects, and gradually bends over them. The leaf itself slightly curls inwards, and so retains its prey until dead.

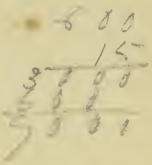
* Drosera.

It will thus be seen that the smallest and most insignificant plants possess their peculiar properties, and that in the world of vegetable life there is ample scope for the keenest observation, and for a scrutiny which cannot fail to end in reverent admiration.









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